THE ZOOLOGIST

No. 679.—January, 1898.

INDIAN WILD CATTLE: THE TSINE AND THE GAUR (MISCALLED BISON).

By Colonel Pollok.

I was very glad to see the article in 'The Zoologist' (1897, p. 489), by Surgeon-Captain Henry S. Wood, on the Tsine (*Bos sondaicus*). Very little is known of that animal, and any detailed account of it must be interesting to all zoologists. The account given by naturalists of the Indian wild cattle is very meagre, for very few of them have been personally acquainted with these beasts in their wild state. I have no pretensions to be considered a scientific naturalist, for I know nothing of anatomy, and very little on the subject of species, genera, &c. But I have observed to the best of my opportunities, and having been a fairly successful sportsman, I trust I may be excused for offering the following observations. Tsine are certainly kittle cattle. During thirteen years' wanderings in Burma I only succeeded in killing three bulls and two cows, and four of them only just before I left India. I agree with Dr. Wood's description and remarks, with the exception that I never saw the warts he mentions, and that those killed by me had the whitish rings round the eyes. Can there be two varieties? Mine were shot at the foot of the Yomahs, on the Sittang side. The bulls also were of a deep red, but I have seen them in the distance almost as dark as a middle-aged Gaur (*Bos gaurus*), that is, coffee-coloured, but never could get at them; nor did I notice the "thickened portion of skin devoid of hair, and of a greyish black colour, the general surface smooth, but in patches very warty, like the skin of a Rhinoceros." Could this have been caused by the animal rubbing his forehead to get rid of parasites? as all Sambur have in May a bare spot about the size of a shilling on the neck, caused, the Burmese said, by their rubbing it on fallen trunks to rid themselves of parasitic pests. There is a dorsal ridge, of course, like in the other wild cattle, but not nearly so pronounced as in the Gaur or Gayal, and not more than in the Wild Buffalo. Mr. Carter, a well-known naturalist and sportsman ("Smoothbore," of 'The Field'), wrote as follows:—

"Colonel Pollok, when referring to the Tsine, says that it has a slight dewlap, which is not always apparent," whilst Jerdon, writing of the same animal, says it resembles the Gaur more than the Gayal, and it wants the dewlap."

I do not think Jerdon had ever seen a Tsine. I can see no resemblance between a Tsine and a Gaur, but a very great one, especially at a distance, between the Gaur and the Gayal. I am glad to see that the doctor says the bull he shot had a slight dewlap, about three inches in its greatest breadth. But whilst his bulls were wanting in the white patches on the buttocks, mine had them very distinctly. The bulls are certainly savage, and attack most pluckily after being wounded,—at least mine did. The first and only one I shot for years was in company with Capt. Hill (now Governor of H.M.'s Jail, Manchester), and he came at us with a will, but had no chance, as Hill used a breech-loading rifle of mine, and I had two heavy two-grooved No. 10-bore rifles by Joseph Lang.

THE GAUR (*Bos gaurus*).

This Wild Bull is found, not only in Southern India and the Trans-Gangetic provinces, but it has been shot at the foot of the Himalaya Mountains, usually called the Terai. I have seen splendid heads brought down from the Mishmee Hills. There are thirteen pairs of ribs. The chest is broad, the shoulder deep and muscular and the fore legs short, with the joints very short and strong, the arm exceedingly large and muscular. The skin on the neck, shoulders, and thighs is very thick—about two inches—and is very valuable for the soles of shooting-boots.

Many old bulls have so little hair that they appear as if they had been shaved. When the bull arrives at maturity, which is at

BRITISH MUSEUM

about six or seven years, rings begin to form at the base of the horns, and it is said one is added each year; if so, I must have shot bulls thirty-five or forty years of age. They prefer hilly ranges with flat table-land at top, at an altitude of about 2500 ft.; but they have been killed up to 5000 ft., and traced up even higher. It is a wonderfully active animal for its size and bulk. They browse on young bamboo shoots, and are also fond of grazing on the young grass which springs up after the annual fires. They retire during the heat of the day, either to forests, or force their way into heavy patches of long elephant-grass, and lie there to escape the gadflies, which otherwise torment them dreadfully. As a rule they are inoffensive, but a solitary bull has been known to charge without provocation; if closely followed, all Gaur are apt to prove pugnacious. They are not difficult to kill; a bullet well placed behind the shoulder, in the middle of the shoulder, or behind the ear, or a raking shot forward, will account for one—I have known one paralyzed by a shot through the dorsal ridge. When alarmed their enormous strength and weight enable them toc rash through tree and bamboo jungle as if they were but reeds. I have known them when alarmed to snort, and stamp with their feet before retiring. The tongue and marrow-bones are unexceptionable; the only portion of the beast fit to eat by Europeans is the middle layer on either side of the dorsal side, just below the hump; the tail makes very good ox-tail soup.

Mr. Sanderson shot a Gaur in Assam, and as its name and that of the Gayal is "Mithûn," he came to the conclusion that there were no wild Gayal; but although "Mithûn" is usually applied to both the Gaur and Gayal, yet, if pressed, the people will own to an "Asseel Mithûn" or true Gaur, and a "Mithûn" (or bastard Gaur) the Gayal. In a Natural History lately published* it has been asserted that the Gaur has been tamed, and that they are kept in captivity by natives on our North-Eastern Frontier, but this is altogether erroneous. The very old bulls are either driven away from the herds, or retire and become solitaires, and are the best worth shooting, but they are wary, and difficult to get at. Other conditions being favourable, wherever there are salt-licks, that is, depressions where a whitish clay impregnated with natron is found, these wild cattle, Deer, and even the Felidæ, will abound. It is the Gayal that are in captivity, and not the Gaur. When I first went to Burma I wrote to Mr. Blyth, the curator of the museum in Calcutta, that the Burmese Gaur appeared to me to be larger, and to differ somewhat from the Indian, but he wrote back I must be mistaken, as the Gayal took its place in that country, the true Gaur being absent. However, I was soon able to correct him by sending him heads, and as he shortly after visited the province, he convinced himself that I was right, and wrote that not only were there the true Gaur in the country, but that the skulls and horns were superior to those from Southern India. I pointed out to "Smoothbore," many years ago, that there were two distinct varieties of this Wild Bull, but he was incredulous until he visited Calcutta and spoke to Dr. Anderson, who said, "Pollok is quite right; here are skulls of both." The discrepancies may be due to climatic influences and abundance of food; undoubtedly the Gaur of Burma and of our North-Eastern Frontier are larger than the Indian. I have shot a bull within an ace of 21 hands at the shoulder, and General Blake, an old sportsman, shot a cow 19 hands, whereas the largest bull killed by him in India was of the same size, and the largest he ever saw killed in the Wynand but two inches higher. Even in India Gaur vary; those of the Western Ghâts being larger, and with a profile like a Ram, in that respect resembling their Burmese brethren. Not only does the Burmese Gaur stand higher, but the dorsal ridge extends further back, to within a span of the croup, the dent in the forehead is deeper, the cylindric crest higher, the horns larger, heavier and more truncated, and but seldom worn at the tips as in the Indian. I fancy food is so plentiful they have no need to grub up roots. The heads of the females are, if anything, longer than those of the males, and the nose is more arched.

---

* 'The Royal Natural History,' evidently misled by Mr. Sanderson. Although a Gayal at a distance looks very like a Gaur, the heads are totally dissimilar; the Gaur's has a semi-cylindrical crest and a concave forehead; the Gayal possesses neither.

Those in the Northern Circars of the Madras Presidency, where I shot a great many, have, comparatively speaking, shorter heads, and less of the Ram look; the dorsal ridge terminating about the middle of the back. Then, too, there is the dewlap—has the Gaur one or not? Up to a few years ago the opinion was—not. But the question cropped up about two years ago. Mr. Bartlett, the late superintendent of the "Zoo," wrote that the one that lived in the Gardens had a well-developed one. Elliot, Jerdon, Campbell, Sterndale, all said he had none, and I too was of that opinion; but "Smoothbore" writes: "A planter of many years' experience in Tranvancore, and a keen observant sportsman, states that in some examples the Gaur have scarcely any dewlap, and that in others it is strongly developed. So marked is this difference, that the natives divide them into two castes, calling one 'Katu Madoo' or Jungle Cow, and the other 'Kat-erimy' or Jungle Buffalo. He has shot old bulls with at least six inches of skin hanging clear of the chest and throat. This seems extraordinary, when naturalists have mostly described the Gaur as having little or no dewlap. Dewlap originally meant the loose fold descending from the chest, which when the animal was grazing swept the dew: thus, in 'Midsummer Night's Dream,' hounds are described as 'dew-lapped, like Thessalian bulls'; but in the humped Indian cattle the fold extends from the throat downwards, and in the Mysore draught bullocks and in the Brahmini bulls is enormous, whilst in the ordinary village cattle the development is small."

The following notes on the Gaur will be interesting to most readers. Mr. A. F. Martin, of Travancore, writes:—

"When the Kaunan Devan Hills in North Travancore were opened out for tea and cinchona, some years ago, the felling of the forest restricted the wild beasts, particularly the Elephants and Bison, when passing across the estate, to one or two pathways. One particular track was, however, left to them for about ten years, when further cultivation led at last to the blocking up of even this right of way. The animals were at first much puzzled, and both Elephants and Gaur took to wandering about the cultivation. The Elephants accommodated themselves to the altered conditions and used the estate paths. The Gaur, more suspicious, took a straight line for their grazing grounds over the rotten felled timber and through the older cinchona plantations, but were often brought up by the sight of white-washed walls surmounted by a corrugated iron roof.

"At last they settled down to a pathway between the old cinchona and a natural belt left between it and the new clearing.

A pit 10 ft. long, 8 ft. wide, and 8 ft. deep, was dug on the boundary, covered with a mat made of reeds and bamboos, over which earth and dry leaves were scattered. The smell of the fresh earth, however, turned them off. Once a Gaur got his fore feet down the side of the pit, but made a bold jump and cleared it.

"After some months the tracks of a large herd were found making for the pit, and it turned out that a Gaur had fallen in, but managed to jump clean out again. It was evident that 8 ft. was not deep enough, and rock in the bottom prevented its being sunk deeper. Another pit was therefore dug some distance away on the same boundary. The ground was on the side of a steep hill, so that whilst the lower wall was 10 ft., the upper was 14t ft. deep."

After a while a cow Gaur fell in, but whilst Mr. Martin was watching her, and waiting for coolies to help in putting logs across the pit, she managed to scramble out; and although she followed the path to the old pit, she avoided it and escaped. Two days afterwards a bull fell in and was secured. Mr. Martin describes the trouble they had with this huge animal:—Getting logs across the top of the pit, with the Gaur charging madly about, was exciting work, and the feat was successfully accomplished only after the utmost difficulty and danger.

"The appearance of any one near the pit always caused a furious demonstration on the part of the Gaur, who dug big caves in the side of the pit with his horns, and thus an approach to the edge was rendered dangerous. In ten days' time he had become somewhat tame. He tossed about the grass thrown in to him, and trampled it into the mud, eating but a small quantity. His only drink was water poured into the pit, and which collected in the holes he had made in the mud with his feet. Matters were very little improved by having bundles of grass lowered by a long piece of cane fastened round, for he charged them furiously, and got a lot of the grass on the ground only to trample it into the mud.

"By degrees he began to eat more and to throw less about. Water was a great difficulty, any attempt, too, at lowering a bucket to him was futile, and only ended in the bucket being flattened out.

"It became imperative, therefore, to get him out of the pit.

To attain this end, a stockade about thirty feet square was made round the pit, consisting of stout poles, fifteen feet high at the lower, and ten feet high on the higher part of the ground. They were each sunk about three feet in the ground, eighteen inches apart, and lashed together with cross sticks and fibre, and formed an almost solid wall. A sheet-iron trough was fixed in one corner. When complete, large quantities of brushwood, ferns, and grass were thrown into the pit, until by degrees it became half full and the Gaur was enabled to jump out. His first act was to charge the corner whence he was being watched, but the only harm done was to himself, his frontal ridge being slightly cut. His attention was then attracted by the water-trough, which he knocked about considerably, but finding the water, he took one good long drink before finally knocking it to pieces. During his examination of his new quarters he once more fell into the pit, and this enabled us to repair damages; but before they were quite completed he jumped out again and caused a general stampede. Having twice hurt his head against the stockade, he never again made any attempt to test its strength. The sheet-iron trough seemed to annoy him more than anything else, and was soon rendered useless. A three-cornered wooden trough was then inserted in a corner and protected by stout poles across the corner of the stockade, and this having been satisfactorily arranged, the Gaur soon became comparatively tame. He allowed the measurements of his horns to be accurately taken, through a window left in the stockade, and very fine horns they were, too, measuring 34½ in. across, from outside to outside of sweep. Although the pit was filled up level with the ground, his previous experience led him to conclude that it was dangerous, and he never crossed it. The result was that the narrow space between the pit and the stockade became ploughed up, and he was up to his hocks in mud. It therefore became necessary to enlarge the enclosure for about a hundred yards in length, taking a bit of jungle in for shelter, and a small ravine which would hold water. A small shed was erected, with sliding bars on the outside and inside, with a view of introducing a domestic Cow as a companion, and so if he approved of her she might be let into the stockade.

"He took to his new quarters very kindly, and soon got to know that grass was left for him at the inner gate of the shed. In a short time it was found that he liked having his nose and head rubbed, and licked the clothes of the person who rubbed him. He took salt from the hand, but did not at first seem to care about it, probably because it was not mixed with earth as in salt licks, which he was accustomed to, spitting it out if he got too much in his mouth at one time. After two months he became quite tame, and permitted his captor to come into the enclosure, not even moving if he happened to be lying down. After the third month he began to shed his hair, and liked it rubbed off with a wisp of grass, allowing the operator to sit on him whilst cleaning him, but he did not like his hind legs or tail to be touched, kicking out as if he were tickled when this was done.

"After four months a domestic Cow was put into the shed, and the two ate from the same bundle of grass, one on the outside, and the other from the inside of the shed. When the Cow was let into the stockade neither of the animals took any notice of the other, so the Cow was taken out. Although so tame with a European, the Gaur would never allow a native to come near him; and it was unsafe to be in the enclosure if a native came anywhere near, as the bull would jump up, snort, and rush about the place in a very excited manner. The cost of bringing grass for him (of which he ate 2 cwt. per diem) was so considerable that it was thought advisable to put a ring through his nose and have him led out to graze with the domestic cattle. A rope was tied round his horns and his head securely fastened between two bars of the stockade; it would then have been easy to ring his nose from the outside, and it is a thousand pities that this was not done. His terror was, however, so great, that the attempt was given up for that day, and it was settled to postpone the operation until he had become accustomed to have his head tied up. Alas! as will be seen, the glorious golden opportunity was lost in this wise:—

"It will be remembered that there was a shed in one corner of the stockade, built with a view of introducing a domestic Cow to bear the Gaur company. In this shed was kept Guinea-grass, to be given to him in the mornings. One night, however, he thought he would prefer having this grass, of which he was inordinately fond, without waiting for daybreak. He managed to push aside one of the sliding bars of the gate, break a lower one down, and raise the top bar sufficiently for himself to get through, he ate the bundle of Guinea-grass, and when this was finished he repeated the performance with the outer bars of the shed and walked out to freedom. We are all wise after the event, but it was great carelessness in not pinning the bars, as is done in all well-managed stables in India. If this plan had been adopted, this magnificent animal, 16 hands 1½ in. fair vertical height, might by this time be enriching the 'Zoo,' where nothing but a miserable two-year-old calf has ever been exhibited."

From one cause or other, no two observers agree as to the colour of a Gaur. Mr. Martin's notes on this adult bull are therefore interesting and instructive :—

"Slaty grey on the dorsal ridge, deepening to intense black on the sides and shoulders; coffee-brown on the hind quarters, turning to black on the flanks; hoofs white; legs white to two inches above the knees and hocks on the outside, and to one inch above the knee and hocks on the inside; hair, inside the thighs and armpits, bright chestnut; neck black, with a large dewlap covered with coarse black hair, hanging down to a little below the level of the knees; head, frontal ridge, slaty grey, black down the front and sides of the face; the muzzle bare and dark slate. Colour of the iris of the eye mottled light brown; pupil slaty blue. But these differ in colour in accordance with age, the very old being black, with the exception of the stockings and forehead, which are dirty white."

In another instance a large bull Gaur was caught in an elephant-pit on the Annemullie Hills, and this animal took water freely from a bamboo spout. The gentleman who caught it, not being in a position to keep and tame the bull, released it; but it was ungrateful, and resented its capture by charging down on its captor whilst the latter was taking its photograph as it emerged from the pit, and he had to fly ignominiously, but not before he succeeded in photographing the animal.

Whether the Gaur would interbreed with tame cows like the Gayal remains to be proved, but I see no reason why it should not. I believe that there are hybrids on the continent between the Java variety of Tsine and tame cattle, but I no not think a Tsine has ever been on show in our Zoological Gardens.

MEASUREMENTS OF AN INDIAN BULL AND A BURMESE BULL AND COW GAUR.

	INDIAN.		BURMESE.			
	1 BULL.		2 BULL.		3 COW.	
	Hnd.	in.	Hnd.	in.	Hnd.	in.
Height at shoulder	19	0½	20	3½	19	0
Height at croup	18	0	19	1	18	0½
	Ft.	in.	Ft.	in.	Ft.	in.
Girth behind shoulder	7	10	8	6	7	6
Tail and tuft	3	3½	3	4½	3	3
Snout to crown of forehead	2	0½	2	3¼	2	4
Length of ears	0	9	1	1	1	0½
,, fore hoof	0	8¼	0	8½	0	7¾
Horns (outside curve) each	2	0½	3	1	2	1
Terminal between the tips	2	7	3	4	1	9
Girth of horn at base	1	6	1	11	1	5
Nape to root of tail, straight	7	5½	7	10	6	10½
Girth of fore leg near chest	2	8½	3	0¼	2	4
Total length from upper lip over forehead to tip of tail, following curve of hump and dorsal ridge	14	0	14	0	13	3

The ears of No. 1 were much torn and split, and the tips of the horns had disappeared altogether. Those of Nos. 2 and 3 were perfect, as were their horns also.

THE VOICE-REGISTERS OF BIRDS.

By Charles A. Witchell.

Musicians have distinguished several ranges of tone in human voices, and, with the object of rendering vocalization even and harmonious, teachers of singing have always laboured to smooth out these breaks or cracks in the voice. Although some teachers deny that these breaks are natural, and contend that they are due to a vitiated style of singing, the breaks are very noticeable in the passionate crying of a baby, and therefore must be considered as quite natural. The most distinct breaks in adult voices are to be found in basses and contraltos, whose deep song notes are widely different from their alto and soprano notes. The jodelling with which lads in the street sometimes amuse themselves very clearly illustrates this subject.

My present purpose is to draw attention to a seemingly analogous break in the voices of many birds. The subject is difficult to discuss, but not, I believe, devoid of scientific value. Perhaps the most obvious break in a bird-voice occurs in the Goose, whose discordant cries strongly suggest the first attempt of a person to play a clarionet. In man the upper register is merely the survival of the child's voice, but it is very difficult to determine whether the same survival of the infantile voice occurs in birds' songs, for half-grown birds rarely sing. It must at the same time be observed that the first songs of young Blackbirds and Thrushes are much like the high squeaky notes to which the voices of the adults often change abruptly from the full song.

In some birds we hear what may be termed the "chest voice" (corresponding, say, to our contralto and bass), and a "head voice" (analogous to our alto and soprano). The Blackbird affords the commonest instance. Its song consists of a few full whistled notes (the number increases as the season advances), never slurred from one to the other; and these, in every successive phrase, are immediately succeeded by some harsh squealing toneless notes, to which the voice breaks from the song. It is suggestive of what would be heard if one of our rich basses concluded every phrase by jodelling hysterically, like a Swiss. The same incident is very noticeable in the Mistle Thrush, whose very brief snatches of full-toned song (consisting of from two to four or five notes) are followed by a few high discordant sounds. In the Common Thrush this break hardly ever occurs as distinctly as in the Blackbird; but, whereas in the Blackbird the sounds are never given except after the full notes, in the Thrush they may constitute the entirety of several successive phrases; and this is especially the case when two Thrushes are about to fight.

In the Nightingale the terminal break in the voice is reduced to an occasional very brief high note. Bechstein observed this, and has carefully rendered it in a very good syllabification of the bird's song, from which the following is an extract:—

"*Tio, tio, tio tix.*
Tzu, tzu, tzu tzi.
Dzorre, dzorre, hi."

This little final note is never repeated or prolonged.

The Blackcap has distinct "falsetto" notes, which precede the full notes and never follow them. I have heard the Blackcap in September uttering a little song of the false notes, without any of the usual full notes.

The Lesser Whitethroat, like the Blackcap, commences its song with harsh notes; and the succeeding full tones, lacking the variety of the Blackcap's warble, are given at one pitch, and form a strain like that of the Cirl Bunting, but more musical.

In the Willow Wren there is a rapid succession of high notes at the beginning of the song, quite distinct from the immediately succeeding sweet full tones. The initial notes are given at about the same pitch. There is never one of these false or harsh notes at the end of the song.

The Robin and Starling seem not to revert to infantile cries in song, except that the former, in August and September, makes great use of the call-note and of the "distress-note," and sometimes forms brief phrases of these cries only. In September the young Thrushes twitter a good deal, but even at this season they sometimes utter full notes. In mid-September last I heard three Thrushes, near Eltham, singing a few very full notes. Similarly, early in October, near Stroud, a Blackbird was singing softly, but in a full deep voice; and in the middle of the month a Mistle Thrush near Eltham was singing very loud phrases of two notes each.

In the Finches the song generally follows a definite course in which several breaks of tone may occur, as in the Greenfinch and Linnet.

In the Yellow Bunting there are two high final notes quite distinct from the other part of the song, and never uttered except at the end of the song. Are they a survival or an acquisition?

I have no evidence that among wild birds the songs of the females have most resemblance to the immature warblings of the young. The female Starling, which I have often heard, sings in much the manner of her mate, but less loudly. In most races the infantile cries are abandoned as the birds approach maturity, as in the *Columbidæ*, whose squeaky notes are not heard from the adults. In the common Shellduck is a survival of the peeting, whistling cry of the young; while in other common Ducks this cry of infancy is lost when the birds attain their full size.

STRIDULATION IN SOME AFRICAN SPIDERS.

By R. I. Pocock, of the British Museum.

To most readers of 'The Zoologist' the Spiders which form the subject-matter of the following pages are probably best known by the comprehensive title "Mygale," a term which was applied to the group of which they are members in the first decade of this century, and has been almost up to the present time universally adopted for them by the compilers of text-books, and the writers of articles on popular natural history. They are also sometimes called Crab-Spiders, presumably from the great size to which most of the species attain; sometimes Bird-eating Spiders, from their alleged propensity for capturing and devouring small birds, a propensity which suggested to Lamarck the generic term *Avicularia*, still in use for one of the South American genera. But during the last fifty years our knowledge of this group has increased by leaps and bounds; the genus has expanded into a family, represented by numbers of genera which are rapidly becoming more and more accurately defined and classified.

Apart from their large size and usually heavy build, these Spiders, referred to a family variously termed *Mygalidæ*, *Theraphosidæ*, and *Aviculariidæ*, may be recognized from the vast majority of other Spiders by possessing two pairs of lung-sacs, and by the circumstance that the mandibles or jaws project horizontally forwards; while the fang closes almost longitudinally backwards.

So far as habits are concerned, it may be added that none of the species spread nets for the capture of prey. Most of them live on the ground beneath stones, or in deep burrows which they excavate in the soil, and line with a layer of tough silk to prevent the infall of loose particles of earth or sand. At nightfall the Spiders may be seen watching at the entrance of their burrows for passing insects, and during the breeding season the females are to be found at its further extremity mounting guard over their egg-cocoon. Other species again live in trees, and spin a silken domicile either between forked branches or in the hollow trunk, or in large leaves rolled up for the purpose. There is no doubt that their food consists almost wholly of insects of various kinds. Nevertheless cases are on record of the destruction of small reptiles, mammals, and birds by these monstrous Spiders.

The discovery of stridulatory organs in the members of this family dates back to the year 1876, when Prof. Wood-Mason came across one in an Assamese species now known as *Musagetes stridulans*. Since that year organs like that which he described have been found, not merely in the solitary species as he and most of his successors appear to have thought would be the case, but in a great number of genera ranging from India to Queensland. For the proper comprehension, however, of the mechanism of this and the other organs of like nature described in this paper, it is necessary to add a few words in explanation of a spider's external anatomy. The fore part of the body, the part namely that lies in front of the waist, and is termed the cephalo-thorax, is furnished with six pairs of appendages arranged radially round its margin. The first appendage on each side, known as the mandible, consists of a short stout basal segment, covered above with hair and furnished below with a thick fringe of bristles, called, from its proximity to the mouth, the oral fringe (Fig. 1, *c*). Articulated to the tip of this basal segment is the second segment, modified to form a long stout pointed fang (Fig. 1, *a*). Behind the mandible on each side comes a short leg-like appendage called the palp, and consisting of six segments, of which the basal is usually termed the maxilla, from its function as a chewing organ. Its inner surface is furnished above with a suture, and below with an oral fringe (Fig. 2, B). Following the palp are the four walking legs, each of which is composed of seven segments, the basal being known as the coxa, and the second, like the second segment of the palp, as the trochanter.

Now these appendages are so arranged that their coxæ, and to a lesser extent their trochanters, are in contact with the corresponding segments of the appendange in front or behind; so that when a limb is raised upwards the adjacent surfaces of the segments in question slide over one another. These surfaces therefore are areas favourable for the development of stridulating organs; for in the great majority of cases—the Cicada, by the way, being a notable exception—stridulation in the articulated animals results from the friction of two mutually roughened adjacent chitinous areas.

Strictly speaking, however, this is not the case with the stridulating organs that have been found in the Spiders now under discussion; for in all cases these organs consist of modified bristles. In the Oriental members of the family two such organs exist, namely, the one discovered by Wood-Mason, and another discovered by myself in several more genera.* In both cases the organ lies between the outer surface of the mandible and the inner surface of the maxilla—the basal segment of the palp; and each consists of a set of vibratile bristles, which are set a-twanging by a series of spines. But whereas in Wood-Mason's instrument the vibratile bristles or notes are placed on the maxilla, and the spines or scraper on the mandible, exactly the opposite obtains in the other instrument, the notes being on the mandible and the scraper on the maxilla.

In some of the African *Theraphosidæ* I have also had the good fortune to discover two stridulating organs, which are not only quite different from each other, but also quite different from those possessed by the genera inhabiting Tropical Asia. One of these organs occurs in the genus *Harpactira*, the common "Mygale" of Cape Colony. It occupies the same position as the analogous organs existing in the Oriental species, being situated between the mandible and the maxilla. A glance at Fig. 1 will show the construction of the organ. The outer surface of the mandible (A) is furnished with a large pad of feathery hairs (*b*), and on the area between this pad and the oral fringe (*c*) are two sets of bristles, both of which, judging from their colour and structure, originally formed part of the oral fringe, and have been derived from it Those of the upper series are long, and have their free ends bent over and more or less interlacing with each other. Those of the lower series are less regularly arranged. In the species figured they are short and spiniform; but in some allied forms they are much less distinctly differentiated from the adjacent hairs of the oral fringe, being longer and more bristle-like, as, for example, in *H. tigrina*. These two rows of bristles are evidently designed to catch against and shake the tips of the long feathery bristles which rise up amongst the hairs clothing the area upon the maxilla between the suture (Fig. 1, B, *d*) and the oral fringe (B, *e*).

---

* For descriptions and figures of these instruments, see 'Natural Science,' vi. pp. 44–50, 1895.

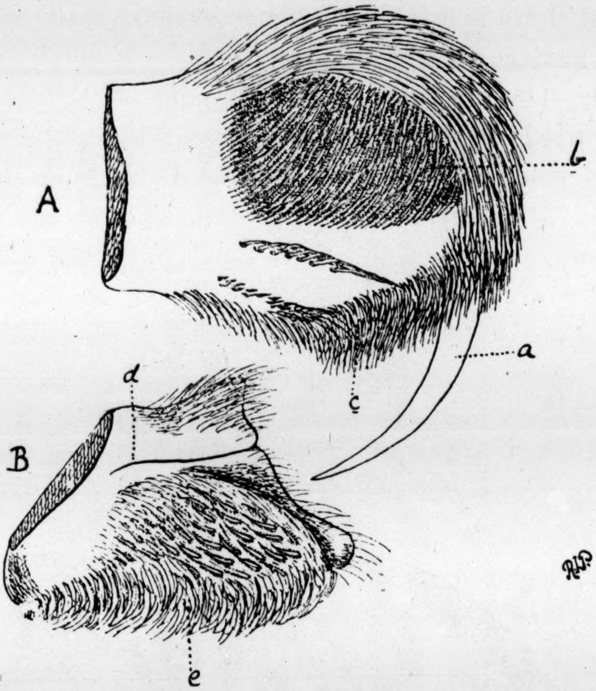

Fig. 1.—Stridulating organ of *Harpactira chrysogaster*.

A. Outer surface of mandible, showing *a*, fang; *b*, pad of feathery hairs; *c*, oral fringe and two rows of modified bristles between the pad and the fringe.

B. Inner surface of maxilla, showing the cluster of plumose bristles between the suture *d* and the oral fringe *e*.

Structurally, this organ, characteristic of *Harpactira*, calls to mind the organ possessed by the Oriental genera *Citharognathus*, *Phormingochilus*, &c. In these, too, the outer surface of the mandible is furnished with a pad of feathery hairs, and the notes or vibrating bristles are also plumose; they are not, however, situated on the maxilla, as in *Harpactira*, but upon the mandible, and result merely from the enlargement of a few of the hairs of the feathery pad.

The next organ to be described, though resembling the others in principle, differs entirely in position. Instead of being lodged between the mandible and maxilla, it is lodged between the palp and the first leg. It has been found in several genera (*Hysterocrates*, *Phoneyusa*, &c.), ranging all over Central Africa, from Old Calabar and the Congo on the west, to Masailand on the east; and also in genera met with in Socotra and Madagascar. If a leg of the first pair in any of these genera be detached, it may be noticed that there is a fringe of hairs bordering the front edge of the upper surface of the first and second segments (coxa and trochanter). On the coxa immediately beneath this fringe, and partially buried in it, there are one or two long stout clavate spines, and some smaller ones as well (Fig. 2, A, *a*). On the trochanter there is beneath the fringe a series of upstanding long curved spines (Fig. 2, A, *b*). When the limb is at rest in its normal position the front surface of these two segments are closely in contact with the posterior surface of the corresponding segments of the palp. It is here therefore that the remainder of the organ is found. It consists of a couple of irregular rows of spines on the basal segment (Fig. 2, B, *c*), and of a thick brush of very fine but stiff bristles upon the trochanter (Fig. 2, B, *d*). When the Spider is allowed to dry after removal from alcohol a

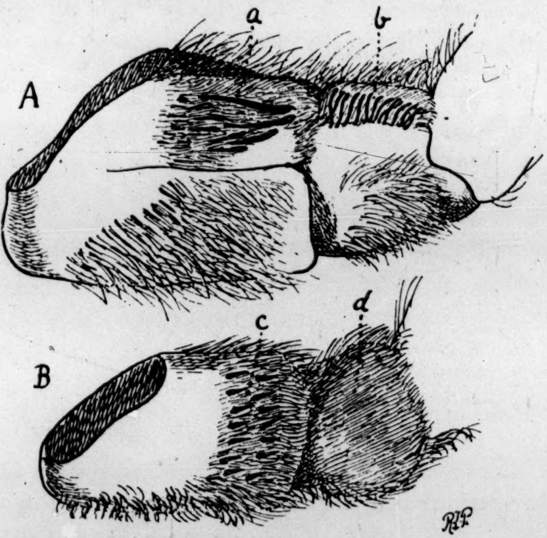

FIG. 2.—Stridulating organ of *Phoneyusa* sp.

A. Anterior surface of first and second segments of leg of first pair, with club-shaped bristles *a* on coxa and row of erect spines *b* on trochanter.

B. Posterior surface of first and second segments of palp, with rows of short spines *c* on maxilla and rigid brush-like bristles *d* on trochanter.

distinct stridulation may be easily produced artificially by rubbing the leg and palp together, the long "notes" on the coxa of the first leg giving rise to a distinct "click, click" when scraped against the spines on the maxilla; while the spines on the trochanter of the first leg, when rubbed against the stiff brush of hairs on the trochanter of the palp, gives out a sound resembling the rustling of a silk dress.

But what is to be said respecting the function of these organs, and what evidence, it may be asked, can be adduced in support of the view that they subserve stridulation? To this question the answer must be that so far as the African species are concerned there is no direct evidence based upon observation of the living animal to show what part they play in the Spider's economy. But that their true and probably sole function is the emission of sound, as has been claimed in the preceding pages, is so strongly supported as to reach practical certainty from what is known of the function of the analogous organ detected by Wood-Mason in the Assamese genus *Musagetes*.

Mr. Peal, it appears, was the first to notice the phenomenon. His gardener, while engaged in digging up a field, unearthed one of these great Spiders, and, not being a collector, naturally enough proceeded to strike at it with his hoe, with the object of ridding the world of such vermin. Thereupon the Spider raised itself upon its two pairs of hind legs, brandished the two remaining pairs in the air, opened its jaws, and waved its palpi up and down, scraping the basal segment to and fro against the outer surface of the mandible, and emitting a sound subsequently described by Wood-Mason as resembling that produced by rapidly dropping shot on a china plate. Fortunately Mr. Peal rescued this historic Spider from the gardener, and afterwards had the satisfaction of seeing it repeat the performance when attacked by a cat. In confirmation of this story, it may be added that Mr. E. W. Pickard-Cambridge told me recently, in course of conversation, that one day, when leaving his bungalow at Coremia in Assam, he met one of these Spiders coming up the steps, and on his approach the beast reared itself up, waved its legs, and hissed at him. And lastly, Prof. Baldwin-Spencer has made similar observations upon an allied genus *Phlogius*, observed by him in Australia, his account being accompanied by a beautifully executed illustration of the organ by which the sound is produced.*

From the knowledge thus supplied touching the function of the instrument in the Spiders just mentioned, one is perfectly justified in concluding that organs constructed upon the same principle, and occupying the same or similar positions, will in all probability be found to perform the same office; and no further basis need be sought for the belief that the African Spiders, *Harpactira* and *Phoneyusa*, and their allies, can stridulate as well as their Oriental relations.

Two other little points connected with the organs may here be mentioned. These are the fringes of hair surmounting the "notes" or vibrating bristles on the leg in *Phoneyusa*, and the pad of hair above the two series of bristles on the mandible of *Harpactira*. From the position of these hair-tufts it may be inferred that they serve to keep the bristles below them free from dirt, which would of course seriously interfere with the performance of their function.

What now is the use to the Spider of the sounds that these organs give forth? It has been suggested that, like the call of the Cicada and the chirrup of the Cricket, they have a sexual significance, and serve to inform one sex of the whereabouts of the other. This belief, however, has no foundation in fact; for, in the first place, there is not a particle of evidence that these Spiders possess an auditory sense; and, in the second place, these stridulatory organs are equally well developed in the males and females, and are not, like the sexual stridulating organs known in other groups, confined to the male, or at all events better developed in that sex than in the female. Moreover, they appear in the young at an early age, and become functionally perfected long before the attainment of sexual maturity. So the supposition that they act as a sexual signal may be regarded as unsupported by evidence.

As a matter of fact, the true key to their function is supplied by the behaviour of the living Spiders. From the accounts above quoted from Mr. Peal and Mr. Cambridge, it is evident that the Spiders emit the sound when on their defence and acting under the stimulus of fear or anger, in exactly the same way as the Rattlesnake makes use of its rattle. So far as I am aware, the only explanation that has been suggested touching the function of the snake's rattle is that it serves as an advertisement of the whereabouts of the poisonous reptile, so that it may be avoided by enemies which might otherwise inadvertently injure it. Similarly poisonous and noxious insects are decked with warning colours, so that they may be readily recognized and not slain in mistake for harmless or edible species. If this be the true explanation of the so-called warning coloration of the insects in question, and of the whirring noise made by the Rattlesnake, there seems to be no reason to doubt that the same significance is to be attached to the stridulation emitted by the peculiar organs recently discovered in the great African Spiders and described in the preceding pages.

---

* Rep. Horn Exped. pt. ii. Zoology, pp. 412–414, pl. xxviii.

NOTES AND QUERIES.

MAMMALIA.

CARNIVORA.

Polecat in Suffolk.—On Dec. 21st I received as a present a fine specimen of *Mustela putorius*, killed a day or two previously in or near Mildenhall Fen, which is in the north-western corner of this county. The fur was in beautiful order, and when skinning and setting up the animal I was surprised at the almost entire absence of any unpleasant smell. In our neighbourhood these animals are now very rare, but they still exist in some numbers in the fen country, where the voles, frogs, and eels provide them with an abundance of prey. 'The Zoologist' for 1888 (pp. 183, 221) contains some interesting information on the subject of Suffolk Polecats.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

RODENTIA.

The Indian Hispid Hare (Lepus hispidus).—This somewhat rare and but little known rodent is fairly plentiful in the Dooars, along the base of the Bhootan Hills, and I have seen them near the banks of the Brahmapootra river below Dhoobri. Its general colour is dark or iron grey, with an unbrowned ruddy tinge. Limbs and body shaded externally with black, the tail rubescent both above and below; the inner fur short, soft, downy, of an ashy hue; the outer longer, hispid, harsh, and bristly, some of the hairs annulated, black and yellow-brown, others pure black and longer, the wholly black hairs more abundant than the lighter ones. The ears are very short and broad. Length: head and body, 19½ in.; tail, 2⅛ in.; ear, 2¾ in. This curious Hare is of a very dark hue, of a heavy make, and Rabbit-like appearance, with small eyes, short and stout limbs, and short whiskers. It is often called the Black Rabbit at Dacca, and the shikaries declare that at times it burrows like the ordinary "bunny." It frequents jungly places, long grass, bamboos, &c., shunning observation, and, from its retired habits is very difficult to observe and obtain. The flesh is white. I generally shot one or two each trip that I made into the Dooars, and occasionally they were for sale in the bazaar in Dacca, having been trapped by native shikaries. The natives assert that it brings forth as many as six at birth. Like the Rabbit, when this Hare is shot its bladder should be emptied at once, or the flesh is apt to get tainted.—F. T. Pollok (Eversal, Luton Road, Harpenden).

AVES.

Pale-coloured Dipper.—On Dec. 12th, 1897, I saw a Dipper (*Cinclus aquaticus*) with the white coloration extending from the breast right up over the eyes and down the back of the neck as far as the shoulders. I was within twelve feet of the bird for upwards of three minutes, so that I had every opportunity of making quite sure of the extent of the pale coloration. Is not this a very rare variety?—Wm. Boulsover (Ferndale, Bakewell).

[It may have been a young bird, which has more white than the adult.—Ed.]

Experiments on the Colours of the Nonpareil Finch.—My Nonpareil Finch (*Cyanospiza ciris*), mentioned in 'The Zoologist' (1897, p. 273), continuing in good health, I endeavoured last autumn, by special diet, to restore the scarlet colour of the breast, which had only been lost a few months before. Stage of moult on commencing experiment, Sept. 6th: feathers of head partly moulted, a few new feathers still in their sheaths over eyes, on the cheeks, and nape of neck; upper tail-coverts all shed, except a single feather; rectrices all gone; moult of breast and under tail-coverts commencing. The chief point of the new diet was the increase of animal food. On reference to my diary I find that in addition to seed the bird had fresh food, comprising cockroaches, bluebottles, house-flies, spiders, and "harvestmen"; also plenty of dried ants' eggs. Perhaps the food was too abundant, as the bird, which often fed from the hand, on one occasion refused some flies offered to it. When the experiment had been carried on for about three weeks new feathers began to appear on the breast, but unfortunately these were yellow. The yellow feathers rapidly increased in number, but I noted that, though the colours of my bird were again partly abnormal, there was no fading in the brightness of those colours, as is often said to occur in captive Nonpareils. When visiting the Liverpool Museum, on students' day, I carefully examined a wild specimen preserved there. I have also examined a normal live Nonpareil in the aviary of the Manchester Zoological Gardens. As compared with these, my bird differs in having the under parts yellow, with a distinct green tinge; circumorbital feathers pale yellow; upper part of breast yellow with orange tinge. Research on the original scarlet feathers of this bird, carefully put aside last year for the purpose, has thrown little light on the nature of the pigment; I do not think, however, it is the coloured fatty oil zoonerythrin, as it is insoluble on boiling with absolute alcohol. In conclusion, I must express my thanks to Dr. Butler for his kind suggestions regarding food, &c., and regret that I was unable to keep the bird in an open-air aviary during the experiment. —Graham Renshaw (Sale Bridge House, Sale, Manchester).

Brood of Young Starlings in mid-November.—We have had many instances recorded of the unusual mildness of the last autumn. It will perhaps be interesting to state that during a walk on Nov. 14th I saw a family party of Starlings (*Sturnus vulgaris*), the young in the slate-coloured plumage of the nestling stage, in a meadow at King's Heath.—F. Coburn (Holloway Head, Birmingham).

Common Roller in Sussex.—A second specimen of *Coracias garrulus* was shot at Catsfield, near Battle, on Oct. 12th. It is a male, and a much brighter bird than the one I recorded in the last volume of 'The Zoologist' (p. 469). The man who secured the hen bird says that he believes that there is still another one in the neighbonrhood. Mr. Bristow, taxidermist, of St. Leonards, has had the two birds through his hands for preservation.—George W. Bradshaw (Hastings).

Montagu's Harrier breeding in Ireland. Correction.—I am sorry to have to correct the statement I made in 'The Zoologist' (1897, p. 467). The specimen of the supposed *Circus cinerascens* shot in Co. Kerry has again been examined by Dr. Sharpe, and he has after all pronounced it to be only a young cock Hen Harrier.—John H. Teesdale (St. Margaret's, West Dulwich).

Nesting of the Hobby in Hants.—I have much pleasure in recording the fact of *Falco subbuteo* having nested last year in Hampshire, although I do not suppose that this is the first instance of its having bred in that particular county. A farmer's lad took three young birds from a Crow's nest near Basingstoke, some time during the nesting season, and sold them to my friend Mr. Blaine. Only one of the birds was a male. My friend purchased the Hawks with the object of training them for falconry. They arrived at his home in Bath safely enough, but after he had kept them for a short time one of the females escaped. I believe it had the "jesses" on when it got away. The other two birds he kept in a large room with a female Merlin, which is trained to fly at Larks. One sad day the Merlin and the remaining female Hobby set upon and devoured the little male Hobby, which was by far the tamest of the lot. I saw two of these Hobbies soon after my friend received them, and was much struck with the beauty of their plumage and graceful pose.—C. B. Horsbrugh (Richmond Hill, Bath).

Brent Goose in Warwickshire.—On Nov. 6th, 1897, an adult male example of *Bernicla brenta* was shot at Earlswood, Warwickshire, and forwarded to me. This is the first record I have of this bird for Warwickshire, although each of the neighbouring counties has recorded it.—F. Coburn (Holloway Head, Birmingham).

Ferruginous Duck in Ireland.—On Nov. 27th, 1897, I purchased, in our Market Hall, a young male example of *Fuligula nyroca*, which I was assured—and I have no reason to doubt the accuracy of the statement—was received with Mallard and other produce from the South of Ireland. But the dealer could not say which county it came from, as consignments were constantly received both from Limerick and Dublin, and these being indiscriminately mixed, it was impossible to distinguish this bird from the other small Ducks they had. It was fortunate I detected it, among a bundle of other Ducks, when I did, as it would certainly have been plucked the same night.—F. COBURN (7, Holloway Head, Birmingham).

Corncrake in December.—It may be worth mentioning that I have received a specimen of *Crex pratensis*, shot last Dec. 2nd in Scotland.—F. COBURN (7, Holloway Head, Birmingham).

Pectoral Sandpiper in Norfolk.—While punting on Breydon, Norfolk, on Aug. 18th, 1897, with my brother, we procured a female Pectoral Sandpiper (*Tringa maculata*). It was near the mouth of the large dyke known as the "Ship Run," and was in company with some Ring Plovers and Dunlins. The whole flock rose, and we killed several. The Sandpiper remained on the flats alone, and on being flushed flew very fast and low, making no noise whatever, and was secured by my brother. It is an adult female, and shows the arrow pencillings on the breast. In measurement it is slightly less than the Caister specimen in the Norwich Museum. Through the kindness of Prof. Newton I have been able to compare it with a set of skins, both of *T. maculata* and *T. acuminata*, and am convinced that my bird belongs to the American race.—J. L. NEWMAN (62, Jesus Lane, Cambridge).

Variety of the Common Guillemot.—A beautiful variety of *Uria troile* was caught on Dec. 4th in Scarborough Harbour. Its entire under parts and head are white, whilst its back and wings are of a whity-brown colour, and its bill, feet, and legs yellowish white. A bird of this description is extremely rare. A similar one was obtained a few years ago at Filey. The writer has visited Speeton Cliffs for many years during the breeding season, and amongst the vast numbers of birds which annually resort there for breeding purposes has never seen but one creamy-coloured Guillemot. The bird in question was placed in my hands for preservation.—J. MORLEY (King Street, Scarborough).

On the reported Summer Appearance of two Species of Birds in Lapland.—In 'The Zoologist' (1897, p. 498) is a narrative of a walk across Finmarken by Messrs. Playne and Wollaston. The authors state that on a small lake not far from Alten they saw a specimen of *Bernicla* *brenta* with five young birds; and on a small pool of shallow water at Kautokeino found three *Phalaropus fulicarius.* Are they sure that the identification should not be *Anser erythropus* and *Phalaropus hyperboreus*, as neither of the first-named species are known to occur on the European continent as summer breeders? The question is one of considerable interest both to me and to ornithologists generally. If no mistake has been made these observations are of great value. All the other species which they saw are known as Finmark birds. It may be that the three Phalaropes were really *fulicarius*, either young (not breeding) or already on migration.—R. Collett (Zoologisk Museum, Christiania).

Winter Notes from Haddiscoe.—A Swallow, and we suppose it to be the last, was busy hawking for flies in the village on November 28th. Rather more Snipe than usual have appeared with us this season on the marshes, besides some thousands of Lapwings, but Golden Plovers have been scarce. Snow Buntings are numerous, and can be seen in very large flocks. The loud whistle of a few straggling Curlews have indicated their presence. Two Whooper Swans crossed the marshes on November 29th, and a specimen of the Eider Duck was shot on Breydon mud-flats. Whilst out on the bicycle on December 5th, I noticed the fir-trees at Herringfleet literally swarming with Gold-crested Wrens; I also heard the note of the Little Spotted Woodpecker, and observed Jays to be fairly common in woods; several Tree Creepers likewise attracted my attention. At Ashby I rode up close to a fine specimen of a White House Sparrow. I have seen three White Sparrows during the last six months, and have also an account of two residing at the railway-station at Great Yarmouth. This variety seems to be locally on the increase at the east end of Fritton Lake, near the decoyman's house. I found a large number of Mallards, Wigeons, Teal, Coots, and Moorhens, resting on the water, seemingly enjoying themselves within a few paces of the deadly decoy-pipes. Whilst crossing St. Olave's Bridge I heard the scream of a Kingfisher; the bird crossed the river and perched upon a yacht. I have seen three Kingfishers lately on the marshes. Fieldfares are scarce, and Redwings less in evidence. Owing to the open weather, Herons, Moorhens, Rails, &c., are having a good time, and few wildfowl have been shot in the district. The game stalls in the market-place of Great Yarmouth exhibit some Mallards, Golden Eyes, and Tufted Ducks. Woodcocks are conspicuous by their absence. We have had a considerable number of Partridges and Pheasants, whilst Hares have also been found in plenty. The company of Pied Wagtails have been noticed daily, and a Common Redshank came quite close to me on December 15th. The Snipe have now gone further afield, as have also the majority of Lapwings. On December 22nd eight Bean Geese appeared at rather a long range, but with small shot from my small-bore gun I succeeded in securing one which weighed 7 lb. — Last C. Farman (Haddiscoe, Norfolk).

Popular Ornithological Fallacies.—Mr. W. Storrs Fox ('The Zoologist,' 1897, p. 514), writes like an honest lover of truth and an enemy to hasty deductions. But has he not tumbled headlong into the identical trap against which he warns others? Methinks so. It is a grievous blunder to generalise from a single instance. Mr. Fox says he would be "glad to know whether experienced field-naturalists consider it a 'preposterous notion' to suppose that a Lapwing may attempt to draw the attention of man or dog from her nest." It matters nothing to me, nor should I be in the slightest degree influenced by, what opinion experienced field-naturalists in general may hold on the subject; it is sufficient that I never said what is so specifically attributed to me—*was* a preposterous notion. Mr. Fox continues:—"Ten years ago last May I came suddenly upon a sitting Lapwing. She rose hurriedly from her nest, and tumbled along the ground, as if she could neither fly nor run." Then follows a little literary *plaisanterie,* in which Mr. Fox invokes a very remote and far-fetched contingency, but which is obviously clearly intended to embody his own incredulity. It would be affectation on my part to take this seriously.

Now I, too, have had similar experiences as the one recorded by Mr. Fox, but they are unquestionably the exception. What I wrote in the October issue of 'The Zoologist' was, that it was a preposterous notion to suppose, that "sitting Lapwings (that is, females)"—note the use of the plural number, please—"decoy intruders from their nests by their devices." And so I say again. I had in my mind the usual habits of the species when disturbed from their nests under ordinary circumstances; not the unusual mode of procedure induced by the fact of a sitting bird having been come upon "suddenly" and unawares. My *ipsissima verba,* "sitting Lapwings," surely imply that eggs were in my thoughts, not young birds. When the eggs are hatched, vastly different tactics prevail; both parents are then assiduous in their clamorous endeavours to draw intruders away from where the young are ambushed.

It is notorious that in olden days the great majority of writers on Ornithology were wholly at fault in the conclusions they had formed on the point at issue. Even Seebohm, whose loss we all so deeply deplore, was prompted to write that the old bird, having glided stealthily off the nest, rose in the air, "to flutter recklessly above the intruder's head." Only a few years ago, through my initiation, the nesting habits of the Lapwing were made the subject of an interesting correspondence in the 'Field.' Mr. F. Boyes, of Beverley, amongst others, entirely agreed with me that Selby alone, of the various authorities then referred to, had hit the true nail on the head. Let us hear Selby:—"The female birds invariably, upon being disturbed, run from the eggs, and then fly near to the ground for a short distance, without uttering any alarm-cry. The males, on the contrary are very clamorous, and fly round the intruder, endeavouring by various instinctive arts to divert his attention." Quite true. The solitary flaw, to my thinking, in the paragraph I have reproduced, is the introduction of he word "invariably." There is no rule without an exception, it is said. Still, it is manifest to me that Selby took his description from the birds themselves in their nesting haunts. The question of Ducks quitting their young and flapping along the water in front of an intruder has no bearing whatsoever on the points involved. Eggs are one thing; young birds another. In the case of the latter, the maternal affection is infinitely stronger. I have stroked a Partridge sitting on her nest; she seemed not at all disconcerted. I have also walked suddenly on to the top of a brood of "cheepers," and been furiously attacked, after a fashion, by the old bird—the female. It is frequently only when cunning is at a discount that birds and animals have recourse to strategy of another kind.

I, too, have picked up Swifts and tossed them into the air—so long ago, alas! as the summer of 1865; but this in nowise affects or discredits my original contention—that tens of thousands of people are under the impression that Swifts can *not* rise from the ground,—any more than does the fact of Mr. Fox having ten years ago found an individual Lapwing doing only what I should have expected it to do under somewhat novel circumstances, invalidate what I said on the subject of that species being the medium of a popular fallacy.—H. S. DAVENPORT (Ormandyne, Melton Mowbray).

PISCES.

Notes from Scarborough.—Whilst Codling fishing off Filey Brig on October 10th, 1897, I found in the stomach of one of my captures a Pogge, or Armed Bullhead (*Agonus cataphractus*). This is, I believe, a common fish in many places, but is only the second time it has come under my notice in the Scarborough district.* During the heavy sea which prevailed during November 6th and 7th, a Garfish (*Belone vulgaris*) was picked up on the North Sands, and a living example of the Lesser Forkbeard or Tadpole-fish (*Raniceps trifurcus*) was also stranded. It was unfortunately mutilated by some lads before I obtained possession of it.—W. J. CLARKE (44, Huntriss Row, Scarborough).

---

* Abundant off Great Yarmouth ('Zoologist,' 1897, p. 546).

INSECTA.

Spider versus Wasp.—In 'The Zoologist' (1897, p. 476), just to hand, I find an interesting note by the Editor on the above subject, and it may therefore be useful to submit a little further evidence. So far as my experience in South Africa goes the balance is undoubtedly in favour of the Wasp. On three occasions I have been fortunate enough to observe a very large black Pompilid stocking its burrow with the body of a huge Mygaloid Spider. In two instances the Spider had already been vanquished by its powerful and active foe, and was being dragged off in a comatose condition for interment. Its weight must have been at least three times that of the Wasp, which was unable to lift it more than half an inch from the ground, progressing thus in short flying leaps, though more frequently the Spider was dragged along, the Wasp running backwards, and buzzing loudly and triumphantly all the while. An interesting feature of the performance was the manner in which the Pompilid managed to find its burrow. In one of the instances I measured the distance traversed, which amounted to no less than thirty yards. When first observed the Wasp was in a narrow footpath, but it shortly left this and entered the grass, which was then some six or eight inches high—a veritable forest in proportion to the insect; through all the denser parts it travelled *backwards*, dragging its prey over or around innumerable obstacles without any hesitation right to its hole, for which it did not have to search in any way. When the method of progression, the distance travelled, and the impediments encountered be taken into consideration, the directness of the course it took after leaving the path seemed little short of marvellous. The third case referred to was perhaps more interesting in that the contest had not concluded when I came upon the scene. The arena was an open roadway, and my attention was attracted at some distance by the movements and angry buzzing of the Wasp. On reaching the spot I found a monster Spider at bay in the middle of the road, with cephalo-thorax erect and the two anterior pairs of thick hairy legs uplifted, ready to strike at a moment's notice; he looked the very embodiment of envenomed rage. Round him circled his implacable enemy, stooping now and then hawk-like in its endeavours to sting his unprotected abdomen, but swerving off again as, quick as thought, the "Mygale" faced round in self-protection. This feinting and parrying would continue for a few moments, when the Wasp would settle on the ground a little way off, running backwards and forwards with its quick jerky gait, and rapidly flirting its black glossy wings, after the manner of its kind—all typical marauders. During these intervals the Spider sat crouched, up, apparently in terror, awaiting the next onslaught, though once he made an attempt to gain the shelter of a neighbouring plant; the insect, however, drove him back towards the open by feigned attacks from that direction. The general attitude of the "Mygale" was clearly one of defence, for only twice did he attempt any determined attack on his sable foe, and then in vain, for quick though he was the Wasp was quicker. At last the latter, in one of its circling flights, made the fatal swoop. Then for the space of a second all I could see was a whirling jumble of Spider and Wasp, which ended by the latter shooting several feet up into the air, and then flying off to a little distance, where it sat cleaning its legs and antennæ and smoothing its ruffled wings. A glance at the Spider was sufficient to show who had come off best in the tussle, for it stood there dejected and quivering; the powerful sting had evidently had its effect. A few minutes later the Wasp made a second attack, and was resisted much more feebly by the Spider, which soon afterwards became sufficiently lethargic to enable the Wasp to seize him with impunity and insert the requisite amount of poison. Here I intervened, and, under protest from the Wasp, took possession of the Spider, which is now in the British Museum Collection.

That the conflicts between these two creatures always end in this manner I strongly doubt, but that they do so in the majority of cases seems evident, for otherwise these giant *Pompilidæ* would cease to use such powerful Spiders as food for their young through the all-compelling agency of Natural Selection. There are several species of Mason-Wasps in South-East Africa which stock their cells with Spiders, but one in particular is thoroughly familiar to all residents from its predilection for building its mud-cells in human dwellings. It is an elegant insect, with its black thorax and abdomen and very long thin yellow waist, but it is an unmitigated nuisance at times, as, for instance, in the case of a friend of mine, who was continually having his American organ deranged by the persistent efforts of one of these insects to use its interior as a nursery. It is perhaps worth noting that this species does not always build external mud-cells, but sometimes bores holes in mud-walls, &c., instead, as I have observed on several occasions, and particularly when living in an "adobe" house in Natal, the walls of which were riddled by these Wasps; and it was an unpleasantly frequent occurrence to have a stupified Spider dropped into one's plate or cup whilst at meals by a startled insect. The Mason-Wasps content themselves with much smaller fry than their relatives mentioned above, and I have frequently noticed that the species which they specially patronize are all dully or else protectively coloured, and for the most part retiring creatures, which hide themselves away in nooks and crannies of foliage, &c. The complete absence of any of the brightly coloured Spiders which sit conspicuously in their webs during the day, such as *Nephile*, *Argiope*, *Gasteracantha*, &c., leads me to believe that these latter are protected by the possession of some distasteful or unwholesome qualities. Particular Wasps seem to prefer particular Spiders, and in nearly all the nests I have examined there has been a marked preponderance of one species. The favourite species varies of course in different districts, but there seems further to be a certain amount of individual preference.

With regard to the other side of the picture, I have seen much fewer cases. The most daring Spiders that have come under my notice are the protectively coloured crab-like species which frequent flower-heads, and I have not unfrequently seen them engaged in sucking various small species of stinging Hymenoptera, which they seem almost always to seize by the neck between the head and thorax; but these Spiders themselves frequently fall a prey to the larger Mason-Wasps. Among the web-Spiders, I have seen Hymenoptera most often eaten by the curious little Sociable Spider, which lives in societies, forming a thickly felted nest varying in size from that of a cricket-ball to a man's head, and traversed throughout by intersecting galleries, being surrounded on all sides by an irregular and sometimes far-reaching snare. In this case, however, the Wasp is caught in the highly glutinous web during the day, and struggles on till sundown, when at last the Spiders emerge; three or four of them set on him, and with a quick bite here and a bite there soon despatch him in his tired state, and the body is then dragged off to the nest to be discussed; for these Spiders do not enshroud their victims. The Sociable Spiders feed principally on crepuscular beetles (*Melelonthidæ* for the most part), but I have found many different and unlooked-for insects in their webs, such as large *Mylabridæ*, migratory locusts, &c., all of which had been eaten.

In experiments I have made in putting Wasps into the webs of a species of *Nephile*, the Spider has either beat a hasty retreat to its lair or else promptly cut the intruder loose. Indeed, so far as my small experience goes, it certainly seems the exception for a web-Spider to attempt to make a meal off anything in the shape of a Wasp.—GUY A. K. MARSHALL (Salisbury, Mashunaland).

NOTICES OF NEW BOOKS.

With Nature and a Camera. By Richard Kearton, F.Z.S. Illustrated by 180 Pictures from Photographs by Cherry Kearton. Cassell & Company Limited.

This is one of those delightful books which, though on the border land of science, can be read by the naturalist with pleasure and instruction, and will arouse the jaded appetite of the general reader. It is the record by two naturalists—for we can scarcely choose between the one who writes so well, and the brother who photographs so fearlessly—of "adventures and observations whilst wandering up and down the British Isles in search of subjects for our camera and note-book."

Photography is now becoming a valuable adjunct to zoology, and a new weapon for the collector and field naturalist. To obtain an exact reflection of a bird in its natural pose or in some little known attitude, to portray the nest in its natural surroundings and with the incubator in position, is surely more to be desired than the effigies which can so often be truly described as "stuffed specimens." Whilst on the other hand such photographs will render possible the highest results in artistic taxidermy. But even more original work can now be done with the aid of a magnesium flash-light. We find on p. 233 the photograph of a Thrush at roost in a hedgerow, taken at nine o'clock on a January night, for which the authors claim, as far as they know, that it is "the first photographic study of a wild bird on its natural roost ever made." The portrait of a Barn Owl achieved by the same means in an old barn in Essex, and a view of a red underwing moth in the act of sampling an entomologist's "sugar" from the trunk of a tree, also afford suggestion as well as interest.

The volume commences with the narrative of an expedition made to that "paradise of British ornithologists," the island of St. Kilda. The brave and kindly inhabitants of this isolated region, so near our own shores, have an anthropological interest of their own. "One of the civilities demanded by the etiquette of the place is that you shall shake hands with everybody you come in contact with night and morning." This practice of excessive hand-shaking seems common to simple folk who live much alone or by themselves, and recalls the same awful ordeal with the Transvaal Boers.* "The married women are distinguished from the unmarried ones by a white frill which is worn in front of the head-shawl or handkerchief, and serves the part of a wedding-ring, which is unknown in St. Kilda." To judge from the illustration. this emblem of matrimony is not unlike the badge which widows adopt among ourselves. These St. Kilda ladies have other more universal traits, as when the minister's servant-maid "asked permission to take the hearth-rug to church by way of a shawl."

The ornithological fauna of the island may well attract both ornithologist and oologist. The claims of the St. Kilda Wren to be considered specifically distinct from the mainland bird are well set out, and photographs given of the eggs and fledglings of both birds. It would, however, be unwise to accept the ornithological lore of the natives, as Mr. Kearton was told, "in all good faith and sincerity, that Great Northern Divers make no nest at all, but hatch their single egg under their wings," in which position his informant "had himself seen a bird carrying one."

Chapter V., on "Nests, Eggs, and Young," is one of the most interesting in the book, both by its illustrations and subject-matter. Mr. Kearton is of opinion "that birds, like human beings, possess individually varying degrees of intelligence, skill, and energy, and that differences in any of these qualities are to the close observer plainly marked in the constructive character of their work." There are many illustrations of strange nesting sites; of old birds on, and young birds in, their nests; while the chapter closes with a charming vignette of a spider's web covered with hoar frost.

We have read this book with pleasure, and closed it with regret.

---

* Other similar traits belonging to these widely separated and isolated peoples are their tastes for sweets, in St. Kilda "especially 'bull's-eyes' and peppermint lozenges"; while nothing delights these islanders more "(men and women alike) than to hear that the enemy is being smitten hip and thigh." The Transvaal Boer should spend a sea-side holiday at St. Kilda.

Observations on the Coloration of Insects. By BRUNNER VON WATTENWYL. Translated by EDWARD J. BLES, B.Sc. Leipsic: Wilhelm Engelmann.

THIS sumptuous folio production, with nine magnificently coloured plates, is a distinct challenge to the theory of Natural Selection, and being based alone on the coloration of insects, to which the author has devoted twenty years of study, the argument is much narrowed, and the area of discussion curtailed into reasonable dimension and clearly defined. As well observed in the Introduction, the consideration of the question is no longer as formulated by the old school of naturalists—"How is man benefited by this phenomenon? The new query which takes its place is: What benefit does the particular species derive from the phenomena observed in connection with it? Teleology has become democratic."

The philosophical conception which permeates most biological teaching of to-day is that all peculiarities of structure and markings are the results of the process of natural selection, by which the living creature has survived as the fittest in the struggle for existence, and that where the result cannot be justified or demonstrated by our theory, the failure is caused by our present ignorance of all the reactions of the phenomena concerned. Brunner von Wattenwyl is quite outside this plane of thought, and considers that there are "a large number of phenomena devoid of benefit, and often, indeed, burdensome, to the animals and plants concerned"; and, further, that "this fact alone is sufficient to demonstrate that the plan of creation does not strive exclusively towards perfecting a species for its own sake."

The markings and coloration of insects are distinguished under nineteen sectional plans, many of which are considered as purposeless for the benefit of the species, while contrary evidence is not discarded. Thus, section 15 is devoted to "Changes of pattern due to Adaptation," and section 18 to "Coloring in relation to Position."

From this brief summary it will not be unexpected that the author decides that: "If one, therefore, calls modification through natural selection 'Darwinism,' a new name must be introduced for the undoubtedly demonstrable occurrence of phenomena in the whole living world which have no relation to their owners or are occasionally harmful to them, and hence are certainly not the result of selection." In fact, in the coloration of insects, "we meet with an arbitrariness striving to produce attributes without regard for their possessors, and, therefore, obviously to be looked upon as the emanation of a Will existing above the Universe."

Probably no greater service can be rendered to evolutionary speculation than by thus clearly marshalling every objection. We become nauseated by simple advocacy, which is often little more than an advertised assent. Brunner von Wattenwyl has here detailed a number of observations which he considers unexplainable by the theory of Natural Selection, and to support his own views on the subject. These are tersely detailed and well illustrated, and though not likely to destroy the Darwinian doctrine, are well calculated to modify dogmatic and hasty generalizations. We can well imagine the hearty welcome Darwin would have given these alleged contradictions to his theory, and the candid manner in which he would have discussed and probably re-explained them.

The Life of Sir Stamford Raffles. By DEMETRIUS CHARLES BOULGER. Horace Marshall & Son.

SIR STAMFORD RAFFLES, whose name is interwoven with that of our Eastern possessions as the founder of Singapore, has a more peculiar claim on the memory of our readers as the founder of the Zoological Society, and as one whose name is frequently used in the specific designation of many species of Eastern animals; and though the details of his life belong principally to the administration of Eastern islands, the time he thus passed was also fruitful in the study of, and assistance rendered to, Zoology. Raffles commenced his career without the flotation acquired by what—if we recollect aright—Huxley once called "social corks"; and though he may well be spared the indignity of that vague term, so much in vogue, "a self-made man," it cannot be disputed that he early formed lofty aims and achieved a very large measure of success. He was born at sea, on board a merchant-ship commanded by his father, left school at the age of fourteen and entered the secretary's office of the East India Company, rapidly rose in preferment, sailed for the East, and became enrolled as one of Britain's great administrators. With this part of his career 'The Zoologist' is necessarily out of touch, but we cannot forbear to mention that in governmental duties he took as his motto Lord Minto's observation: "While we are here, let us do all the good we can."

During his sojourn in the East it is only by side lights that we are able to observe the naturalist and forget the Proconsul. He met Horsfield on his first visit to Suracarta, and "from that time forward, both in Java and Sumatra, Dr. Horsfield served with Raffles in a scientific capacity, and, after the death of his chief, the doctor bore testimony to "the zeal, ardour, and liberality, with which Sir Stamford both pursued and patronized science." He received little encouragement in the formation of zoological collections. When, in 1820, he forwarded home the first half of a collection illustrating the natural history of Sumatra, "he received in reply a coldly worded despatch, remonstrating with him on his extravagance, and forbidding him to expend any of the Company's funds in such directions." But fortune was still to deal a heavier blow. On his final return, in 1824, with the remainder of his collections—both manuscripts and specimens—the ship that bore him was destroyed by fire and the whole of this precious cargo was consumed. The loss may be estimated in his own words. Besides the literary treasures, "all my collections of natural history; all my splendid collections of drawings, upwards of *two thousand* in number, with all the valuable papers and notes of my friends Arnold and Jack; and, to conclude, I will merely notice that there was scarce an unknown animal, bird, beast, or fish, or an interesting plant, which we had not on board; a living Tapir, a new species of Tiger, splendid Pheasants, &c., domesticated for the voyage; we were, in short, in this respect, a perfect Noah's Ark."

During his stay in London, in 1817, he had discussed with Sir Joseph Banks a plan "for establishing in London a zoological collection and museum, which should interest and instruct the public." This may be taken as the inception of an idea matured in 1825, when the prospectus of the new Zoological Society was drawn up and issued on the 20th of May. Sir Stamford Raffles was the first President of a Society vastly developed since then, and now one of our famous scientific institutions. To have done this is alone sufficient to enshrine Raffles in the annals of the vast zoological enterprise which has been achieved by our own countrymen.

The last years of Raffles were clouded by many worries and ill-health. The success of his career had ensured envy, hatred, malice, and all uncharitableness. He died suddenly, in his forty-fifth year, was buried in Hendon Parish Church, "but, owing to differences with the vicar, a member of a slave-owning family, no monument was erected at the time, and the actual site of the grave has not been ascertained."

This is a book that may well be studied by Colonial politicians, imperialistic or otherwise, and the naturalist will read the life-history of the founder of our Zoological Society.

All about Animals. George Newnes, Limited.

THIS book may be described as a Zoological Photographic Album, in which each portrait is supplied with a basal paragraph affording characteristic details of the animal represented. It thus fulfils the promise contained on its title-page: "For Old and Young. Popular, interesting, amusing." Most of the animals have been photographed while in captivity, though a few have been portrayed with their natural surroundings, of which "In the Jungle"—Elephants with a back-ground of palm trees—is particularly pleasing.

The first idea on turning over these pages, is, that here is another excellent zoological incentive for young people, and certainly no more attractive volume can reach the hands of juveniles with a taste for natural history, as from personal experience we can bear witness. But the zoologist has still much to learn of the natural attitudes and physiognomy of many living creatures, which on more than one occasion artists have created from "stuffed specimens," and which photography applied to living animals is now beginning to reveal. It is difficult to appraise the suggestive and modifying influences which photography has brought, and will bring, to bear on many zoological conceptions. To the cabinet naturalist in particular it is almost an instruction in field observation, and, having proved the charm in many recent works, will in time be demanded when animated nature is illustrated. As the writer of the text well observes, in reference to a fine photograph of the head of "The Prairie King": "This portrait of the head of the Great Bison will be a valuable document if ever the living animal disappears from the New World. No one could reconstruct from the thousands of skulls and bones which lie bleaching on the prairie the exact features and lineaments of the extinct Prairie King." Already of many animals now extinct we know as little of their natural appearance as we do of the features of most of the ancient philosophers.

Of the many illustrations we may mention the open mouth of the Hippopotamus, which is a fine study; the Secretary Bird is good, but its attitude is modified by confinement, and this bird particularly requires to be seen in its natural condition; the Common Seal rising above the water is a living picture; the Serval's Leap is probably not taken from life; the angry Cobra is a demonstration in ophidian attitude; the Mute Swans with their surroundings and shadows form a very happy production; while a Rhea sleeping, and the "final shower of an Elephant's bath" are revelations.

The work is produced at a very reasonable price, and we trust that it may achieve a success sufficient to encourage the production of a further series.

EDITORIAL GLEANINGS.

The welcome appearance of the 'Zoological Record' for 1896 took place last November. The only missing contribution is that on the Echinodermata, which is promised in combination with that of 1897, in the next volume. We may form some estimate of the zoological activity displayed in the year 1896 by an enumeration of the "titles" of separate communications, papers, or memoirs dealing with the different branches of Zoology.

Mammalia	291	Crustacea	206
Aves	639	Arachnida	114
Reptilia and Batrachia	307	Myriopoda & Prototracheata	56
Pisces	240	Insecta	1264
Tunicata	30	Vermes	251
Mollusca	391	Cœlenterata	122
Brachiopoda	20	Spongiæ	57
Bryozoa	21	Protozoa	190

As usual the Insecta have attracted the largest number of workers, and it appears by a computation made by Dr. Sharp, the Editor, that no fewer than 8907 species and 1040 genera and subgenera have been described as new by entomologists.

The above enumeration provokes one other reflection, and that is—what a number of different groups of living creatures are at present neglected in these pages.

With the December number of the 'Annals and Magazine of Natural History,' Dr. William Francis resigns the responsible editorship to his son. For sixty years from the time of its inception Dr. Francis has been connected with this well-known and valued Natural History Magazine, of which 120 volumes have now appeared. Since 1859 he has acted in an editorial capacity. This is an unique record, and thanks for the past and best wishes for the future, from many sources, will follow both Dr. Francis in his retirement and his son in the editorial chair.

Mr. H. M. Evans has written, and Messrs. W. Brendon & Son, of Plymouth, published, a 'Comparative Status of Birds found in the British Isles and in the County of Devonshire, with the Habitat and Range of each

Species." The method pursued is in alternate columns—Status of British Isles, and Status Devonshire,—to denote whether the species is Resident, Summer Visitor, Winter Visitor, or Straggler. Recent additions to the British List are appended.

As to Devonshire, Mr. Evans reports that the "county, as might be expected from its great extent and varied physical characteristics, is visited by an extraordinary number of species. It can claim, approximately, three-fourths of the resident nesting-birds of our islands, two-thirds of the summer residents, forty-two out of forty-three winter residents, and seven-eighths of the stragglers. There are, in fact, eighty-four residents, thirty-four summer residents, forty-two winter residents, and one hundred and twenty accidental visitors — all together, four-fifths of the birds ever found in the whole kingdom."

Mr. G. W. Murdoch, the well-known editor of the Science and Natural History Department of the 'Yorkshire Weekly Post,' is engaged in the production of a new Guide to Lakeland, in which special chapters will be given on "Natural History," "Angling," "Scandinavian Elements in Lakeland Places, Names," &c.

'L'Intermédiaire des Biologistes; organe international de Zoologie, Botanique, Physiologie et Psychologique' has recently appeared, and the second number (20th November, 1897) is now before us. It is published in Paris, under the direction of Dr. Alfred Binet and Dr. Victor Henri, issued by C. Reinwald, with Schleicher Frères as "éditeurs." It is largely a means of communication between naturalists and others by questions and answers, in fact, on the principle of our well-known literary weekly, 'Notes and Queries.' It also professes to give a 'Sommaire de Périodiques' on General Biology, but this seems confined to a list of contents only.

'Leitfaden für Aquarien- und Terrarienfreunde,' von Dr. E. Zernecke, published at Berlin by Gustav Schmidt, is the latest addition to the literature on the successful management of Aquaria and Vivaria. Plants suitable for the aquarium are not only well described and illustrated, but their growth and management also dealt with. Amongst the suitable inhabitants of the fresh-water aquarium, several fish are enumerated and figured which are somewhat seldom seen in aquaria in this country, such as members of the tropical and subtropical American genera *Pimelodus* and *Callichthys*, as well as the "Paradise" and "Telescope" fishes (*Polyacanthus*), the Gurami (*Osphromenus*), and the "Kletterfisch" or, as known to ourselves, "Climbing Perch" (*Anabas scandens*), from the Oriental region. The

Marine (das Seewasser) Aquarium is treated with much greater brevity, though more space is afforded to the Vivarium (das Terrarium), and some suitable plants for the same detailed. Altogether the last section has been more fully treated by the Rev. G. C. Bateman (*vide* 'Zoologist,' 1897, p. 478); but Dr. Zernecke's volume is well illustrated, and will prove a useful handbook on a subject as yet none too well known.

GENERAL Nicolas de Depp, who is evidently an enthusiastic pisciculturist, has contributed to the 'Bull. Soc. Nat. d'Acclimatation de France' (October, 1897), under the title 'L'Aquarium-Serre,' a description, with plans and views, of aquaria and necessary buildings which he has constructed on his residential property at Odessa. Many useful hints as to structure and appliances are given, while the combination of plant-conservatory and aquarium is not only to be highly commended, but is also a sequence which in its infrequency creates surprise.

'ON *Chlamydoselachus anguineus*, Garm., a remarkable Shark found in Norway, 1896,' is the title of a memoir recently published at Christiania, by Prof. R. Collett. This Shark which was only described in 1884, and of which there are at least fifteen specimens preserved in the different museums of Europe and America, is one of the most remarkable of living fish. It is not "closely related to any present variety of Shark, or to any that have become extinct in later periods of the earth's existence," but its "ancestors belonged to the older palæozoic formation—the Devonian—when there lived forms of Sharks whose teeth were comparatively of the same nature as those of the present specimen. No known vertebrate has thus its nearest kindred so far back towards the dawn of organic existence. In other words—*Chlamydoselachus* is the oldest of all living types of vertebrates." The fish under notice was caught in a net at Bugφnæs, in the Varanger Fjord (69° 45′ N. lat.), on the 4th August, 1896, which had been set at a depth of about 100 to 150 fathoms for catching Coal-fish (*Gadus virens*).

Prof. Collett remarks:—"When one regards the eel-like construction of its body, the almost serpentine head, its deeply cleft mouth, the frilled and protruding gill coverings, and its formidable array of teeth, which call to mind the python's, one's thoughts turn to that mythical creature which, with more or less regularity, is annually described, or even depicted, in the columns of newspapers, whose existence, however, has never been confirmed, but which, as a rule, is believed in by all (except by naturalists), namely, 'the Sea Serpent'; and the *Chlamydoselachus*, in fact, appears to satisfy most demands of an ideal sea serpent."

Some interesting figures concerning the sums paid to the late Rev. J. G. Wood, the naturalist, for his popular books, are given by Mr. Newton Crosland in his autobiography, 'Rambles Round My Life,' recently issued. "If I recollect rightly," says Mr. Crosland, "he got £30 for each of his books 'The Common Objects of the Country' and 'The Common Objects of the Seashore.'" Mr. Crosland remonstrated with Mr. Wood on his humble opinion of himself, so when he undertook his great publication, the 'Natural History,' in three volumes, he asked £2000 for the work, and he got it.

The International Congress of Zoology meets on Aug. 23rd at Cambridge. The following executive Committee has been formed:—

President: The Right Hon. Sir John Lubbock. *Vice-Presidents:* The Vice-Chancellor of the University of Cambridge, Dr. W. T. Blanford, Sir W. H. Flower, The President of the Linnean Society (Dr. A. Günther), Prof. E. Ray Lankester, Prof. A. Newton, Dr. P. L. Sclater, The President of the Entomological Society (Mr. R. Trimen), Sir William Turner, and Lord Walsingham. *Treasurers:* Prof. S. J. Hickson and Dr. P. L. Sclater. *Secretaries:* Prof. F. Jeffrey Bell, Mr. G. C. Bourne, and Mr. A. Sedgwick. *Ordinary Members:* Dr. Gadow, Mr. F. D. Godman, Lieut.-Col. Godwin-Austen, Sir George F. Hampson, Mr. S. F. Harmer, Prof. Howes, the Hon. W. Rothschild, Mr. H. Saunders, Prof. Seeley, Dr. D. Sharp, Mr. A. E. Shipley, Prof. C. Stewart, and Dr. H. Woodward.

Mr. Louis Becke, in the 'Pall Mall Gazette,' has recently contributed some particulars of vessels attacked by infuriated Whales:—

"Only three years ago the writer saw in Sydney Harbour the barquentine 'Handa Isle,' which, on the passage from New Zealand, had been so attacked. She was a fine vessel of three hundred tons, and was sailing over a smooth sea with a light breeze when two large Sperm Whales were sighted. They were both travelling fast, and, suddenly altering their course, made direct for the ship. Then one sounded, but the other continued his furious way, and deliberately charged the barquentine. He struck her with terrific force just abaft the mainmast and below the waterline. Fortunately the barquentine was laden with a cargo of timber, otherwise she would have foundered instantly. The blow was fatal to the cetacean, for in a few minutes the water around the ship was seen to be crimson with blood, and presently the mighty creature rose to the surface again, beat the ensanguined water feebly with his monstrous tail, and then slowly sank.

"Some of these onslaughts upon ships were doubtless involuntary; as where a Whale, attracted by the sight of a ship, had proceeded to examine her, misjudged his distance, and came into collision with disastrous effect to both. But there are many instances where the Whale has deliberately charged a ship, either out of pure 'devilment,' or when maddened with the agony of a wound inflicted by a harpoon. Some years ago a small school or 'pod' of Sperm Whales was sighted off Strong's Island, in the Caroline Archipelago, by a New Bedford barque and a Hawaiian brig. Both ships lowered their boats at once, and in a very short time Captain Wicks, of the Hawaiian brig, got fast to a large bull who was cruising by himself about half a mile away from the rest of the 'pod.' As is not uncommon among Sperm and Hump-backed Whales, the rest of the school, almost the instant their companion was struck, showed their consciousness of what had occurred, and at once crowded closely together in the greatest alarm, 'lying motionless on the surface of the water as if listening, and sweeping their huge flukes slowly to and fro as a cat sweeps its tail when watching an expected spring from one of its own kind. So terrified were they with the knowledge that some unknown and invisible danger beset them, that they permitted the loose boats—five in number—to pull right on top of them.' Four of the boats at once got fast without difficulty, leaving three or four of the Whales huddled together in the greatest fear and agitation."

One of the largest bull Whales which had been wounded, after destroying one of the boats, suddenly appeared twenty minutes later close to the Hawaiian brig. He was holding his head high up out of the water, and swimming at a furious speed straight towards the ship, which he struck a "slanting blow just for'ard of the forechains." Everyone on board was thrown down by the force of the concussion, and the ship began to make water fast. Scarcely had the crew manned the pumps when a cry was raised, "He's coming back." Looking over the side, the Whale was seen some thirty feet below the surface, swimming round and round the ship with incredible speed, and evidently not injured by his impact. In a few moments he rose to the surface about a cable length away, and then, for the second time, came at the ship, swimming well up out of the water, and apparently meaning to strike her fairly amidships. This time, however, he failed, for a bomb was fired into him from another boat which occasioned almost immediate death.

In last year's 'Zoologist' (p. 287) we drew attention to the projected expedition of Lieut.-Col. H. W. Fielden and Mr. H. J. Pearson to the Petchora River and the coasts of Siberia. The expedition has been successfully accomplished, and the naturalists have returned. The zoological results have been communicated in abstract to a meeting of the Royal Geographical Society. Col. Fielden and Mr. Pearson started in the 'Laura' from Skaars on June 17th, and sighted Kolguev on the 25th, whence they set their course for the island of Dolgoi. Soon after they came upon the pack ice, which prevented their advance. It was extremely dirty, covered with gravel and silt, and with branches and logs scattered over it. Finally they forced their way into Dolga Bay, on Waigatz Island. Eventually they continued their voyage to Novaya Zemlya, and anchored in Cairn Bay on June 26th, where there is a Samoyede settlement. With regard to the scientific results of the voyage, the ornithology of Waigatz, Novaya Zemlya, and the North Island has been practically worked out, and the results of their observations will soon be published. The botanical collections were satisfactory, and several interesting plants had been added. But by far the most important discovery was the finding of what had hitherto been considered the rarest and most inaccessible of flowering plants, the *Pleuropogon sabinii*, growing in the greatest profusion both in Novaya Zemlya and Lutke Land. Collections of rocks and fossils, insects, and marine invertebrates have also been made.

A propos to the subject of "Wasp *v.* Spider," discussed in 'The Zoologist' (1897, pp. 475–76, and *ante*, p. 29), Mr. Richard M. Barrington has contributed to the 'Irish Naturalist' (1897, p. 325) an account of a combat between a large Spider and a Wasp which he one day placed in its web. In this encounter victory remained with the Spider, but the writer adds:—"I don't think this would have been quite possible save for the apparent power possessed by the Spider of lassoing a dangerous enemy by shooting out its glutinous threads by a sort of centrifugal jerk when sweeping past its victim." In 'Knowledge' (vol. xx. 1897, p. 301), Mr. Enock describes an experiment of "presenting a large Bumble-bee *tail* first to the side of the silken tube of a British Trap-door Spider. The Spider seized it, but was wonderfully careful in so manipulating it that without seeing the Bee (the aerial part being quite opaque), she managed to turn it completely round until she had firm hold of the head; *then* she promptly pulled the Bumble-bee through and down."

Mr. William Thorpe has presented to the British Museum the shell of a giant Tortoise which lived for upwards of two hundred years in the grounds of Plantation House, in the island of St. Helena. It was frequently the object of much curiosity on the part of the great Napoleon during his enforced stay on the island.

With the gradual extinction, as evidenced by a recently-issued return of the Cape Agricultural Department, of the various species of big game in South Africa, it is not surprising to learn from a report just made to the Colonial Office that Monkey-skins are scarcer than formerly on the Gold Coast, the increasing warfare which is carried on against these unfortunate animals having resulted in a total extermination of the species in the less distant provinces. In 1894 no fewer than 168,405 skins were exported, valued at £41,001, whereas last year the number fell to 67,660.

ACCORDING to the 'Temps' correspondent at Antananarivo, a special fine net made entirely of Spiders' webs is being manufactured in the professional school at Antananarivo. The process is a very simple one. The thread of several dozen Spiders is wound on winders, the quantity produced by each Spider ranging from fifteen to forty yards. The covering of the web is removed by repeated washing, and the web made into a thread of eight strands. When the thread is spun it is easily woven into a gauze, which is very fine but very strong. It is to be used for an experimental covering of a navigable balloon by M. Renard, the head of the French military balloon school at Chalais, near Paris, who has been engaged for many years in experimenting in aerial navigation. It is believed that the difference in the weight of an ordinary covering and the Spiders' web-net will make a great improvement.—*Dalziel.*

A MONSTER Swordfish was brought to the market at Taiping recently. It was 30 ft. long, and its flesh and bones weighed 900 catties, or 1,200 lb., fat 230 catties, entrails 400, and the sword 30 catties. Total weight, 2,070 lb.—*Penang Gazette.*

AT Stevens's well-known Sale Rooms, on the 6th December last, there was sold the collection of stuffed birds formed by the late Mr. Richard Ashby, of Egham. This collection was interesting as containing many birds that were acquired at the Henry Doubleday sale. There was also sold at the same time a skeleton of the Moa, at the *price of forty-eight guineas,* which was really made up of "the bones of one species," and had been set up by Capt. F. W. Hutton from the Enfield deposit, who wrote: "After rejecting bones of young birds and others too imperfect for measurement, I had 1,031 leg-bones left." The Enfield deposit was described by Mr. H. O. Forbes in 'Nature,' March, 1892. Since then other collections have been sold in mournful sequence, such as the Lepidoptera formed by the late Rev. A. Matthews, of Gumley.

ANOTHER of the monographs devoted to the "North American Fauna," and published by the United States Department of Agriculture, has reached our hands. This is No. 13, and is a "Revision of the North American Bats of the Family *Vespertilionidæ*," by Gerrit S. Miller, Jun. This publication has the good fortune to be founded on ample material. The collection of Bats, which consists of more than 3000 specimens, chiefly in alcohol, has been brought together during the past few years by the field naturalists of the Survey. In addition the writer has examined the Bats in the United States National Museum, the American Museum of Natural History, and several private collections, making a total of about 2,700 specimens of American *Vespertilionidæ*. With these animals, however, alcoholic preserved specimens are not the only thing needful, and Mr. Miller regrets that so few well-preserved skins are available for comparison. "Without good series of dry specimens it is impossible to determine the limits of individual variation in colour, as conclusions of the most general kind only can be based on specimens that have been subjected to the action of alcohol." Forty-six species and subspecies of *Vespertilionidæ* are recognized as occurring in America north of Panama and in the West Indies.

We have received from the "Department of Agriculture" of the Province of British Columbia an excellent publication on "Insect Pests and Plant Diseases, containing remedies and suggestions recommended for adoption by farmers, fruit-growers, and gardeners of the Province." Mr. R. M. Palmer, Inspector of Fruit Pests, in his Report for the year ending 1896, speaking with reference to his work in visiting and inspecting orchards in the different section of the Province, says:—"The necessity of this work has been emphasized by the discovery of the most dangerous scale-insect enemy of fruit-trees known—the San Jose Scale (*Aspidiotus perniciosus*)—in two orchards on Vancouver Island, and although, so far as known, this pest has not spread, it is hardly possible that the infestation is limited to these cases. . . . It has cost the fruit-growers of California and Oregon hundreds of thousands of dollars to fight the San Jose Scale, and the war against it still continues. . . . The appearance of San Jose Scale in orchards and gardens in Ontario, and some of the Eastern and Southern States, has created widespread consternation amongst fruit-growers there, and a demand for legislative assistance from the respective governments in dealing with the pest, similar to that enacted in the Pacific Coast States and British Columbia, has sprung up."

Ornithologists who care for the by-paths of their Science will find a paper on "The Mythology of Wise Birds," by H. Colley March, in the 'Journal of the Anthropological Institute,' just published (vol. xxvii.

p. 209). "Literature abounds in poetical allusions to the wisdom of birds, to the warnings they desire to deliver, to the tidings they are ever ready to carry. 'We bear our civil swords and native fire,' says Prince John (2 Hen. IV. v. 5), 'as far as France, I heard a bird so sing. 'Curse not the king,' says the Preacher, 'for a bird of the air will carry the matter' (Eccl. x. 20). Such allusions are poetical only; but the voices that primeval man heard, primeval whether in time or only in civilization, were as real to him as the visions he saw. The history of demonology conclusively declares them to have been neither romance nor make-believe." As the author further remarks, "It was natural that in different countries men should have been attracted by different orders of birds. The Grallatores, or Waders, whilst they were esteemed throughout the Old World, were chiefly venerated in Egypt; and the same may be said of the Accipitres, such as Eagles, Hawks, and Vultures. The Columbæ were much admired in the East; and of the Passeres, the suborder Conirostres found most favour in Europe." The subject is a most interesting one; we all recall the Bennu (*Ardea bubulcus*), sacred among the ancient Egyptians to Osiris, and the use of the Dove in early Christian art.

'SCIENCE' announces the death of the eminent entomologist, Dr. George H. Horn, at Philadelphia, on Nov. 25th last, at the age of fifty-eight. He has bequeathed his valuable entomological collections and books and an endowment of 200 dols. per annum to the American Entomological Society. From the residuary estate, after the death of his sister, further bequests will accrue to the Entomological and other scientific societies. Dr. Horn was a renowned coleopterist, and was a contributor to Godman and Salvin's 'Biologia Centrali-Americana.'

JOHANNES FRENZEL, formerly Professor of Zoology at Cordoba University, in the Argentine Republic, and of late years director of the biological and fishery station on the Müggelsee, near Berlin, died on Oct. 21st, owing to an accident on the lake. Dr. Frenzel was only thirty-nine years old at the time of his death —*Natural Science.*

SINCE the advent of the rinderpest at Groote Schuur, Mr. Rhodes's well-known residence at the Cape, the following animals have died of the disease:—One Eland Bull, one Koodoo, one Hartebeeste, one Klipspringer, one Steinbuck, and one Antelope. One Eland Cow, which took rinderpest and was inoculated, has since recovered.

A NEW fish has come to light. In the 'East London Dispatch' the menu of the St. Andrew's dinner is thus reproduced:— *Soup*—Cockie Leekie and Clear. *Fish*—Scotch Haggis.

WE regret to announce the death of Mr. Henry Stacy Marks, R.A., which occurred at his house near Regent's Park on Sunday, Jan. 9th. He was born in London on Sept. 13th, 1829. His diploma picture, "Science is Measurement," is one of his most characteristic paintings. It shows an old naturalist, himself almost a skeleton, measuring the skeleton of a huge bird, and combines the artist's dry humour with his knowledge of bird anatomy. Every visitor to the Duke of Westminster's fine home at Eaton Hall will remember the twelve panels of birds—gorgeous in colouring, accurate in drawing—which adorn that palatial residence. It was as a painter of curious and humorous bird-life that Mr. Stacy Marks was supreme. He studied the quarter of the birds at the "Zoo" with untiring patience, and the result was to be seen in several Academy canvases and in more than one private exhibition of water-colour studies, remarkable for dexterity of handling, colour, and humour. Mr. Marks's favourite bird-sitter probably was the Adjutant Stork, but Flamingoes always found in him a congenial painter, and his Parrots, Cockatoos, and Macaws are very highly prized possessions of those collectors lucky enough to secure them.

BRITISH 23 AP 98 MUSEUM

BRITISH
23 AP 98
MUSEUM

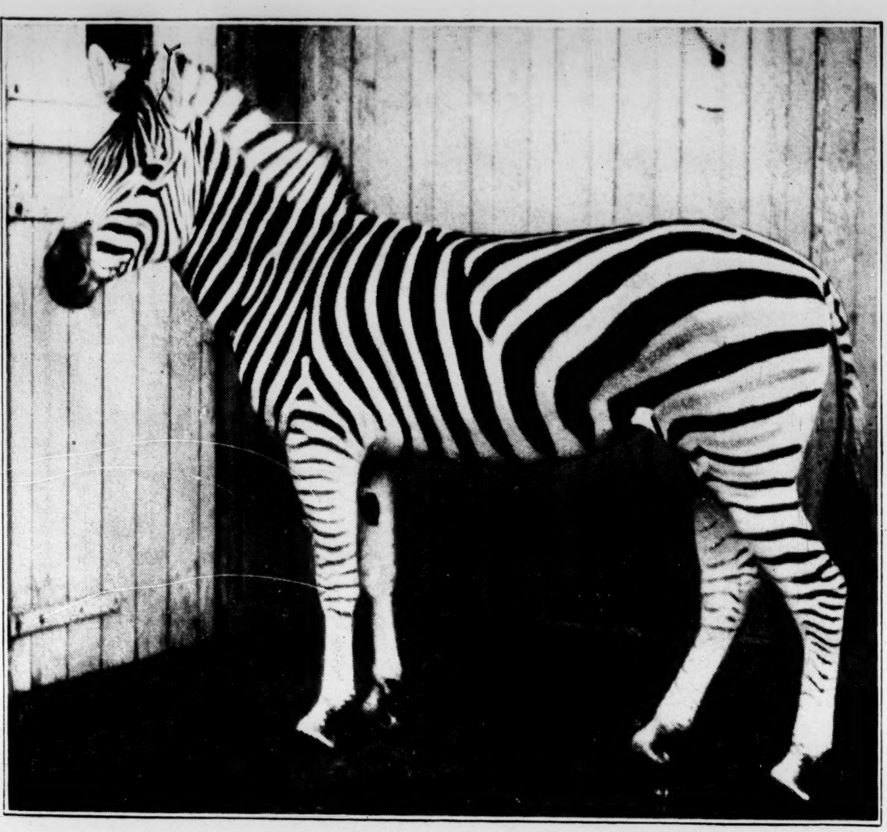

Fig. 1.—Matopo. (*Photo. by Swan Watson.*)

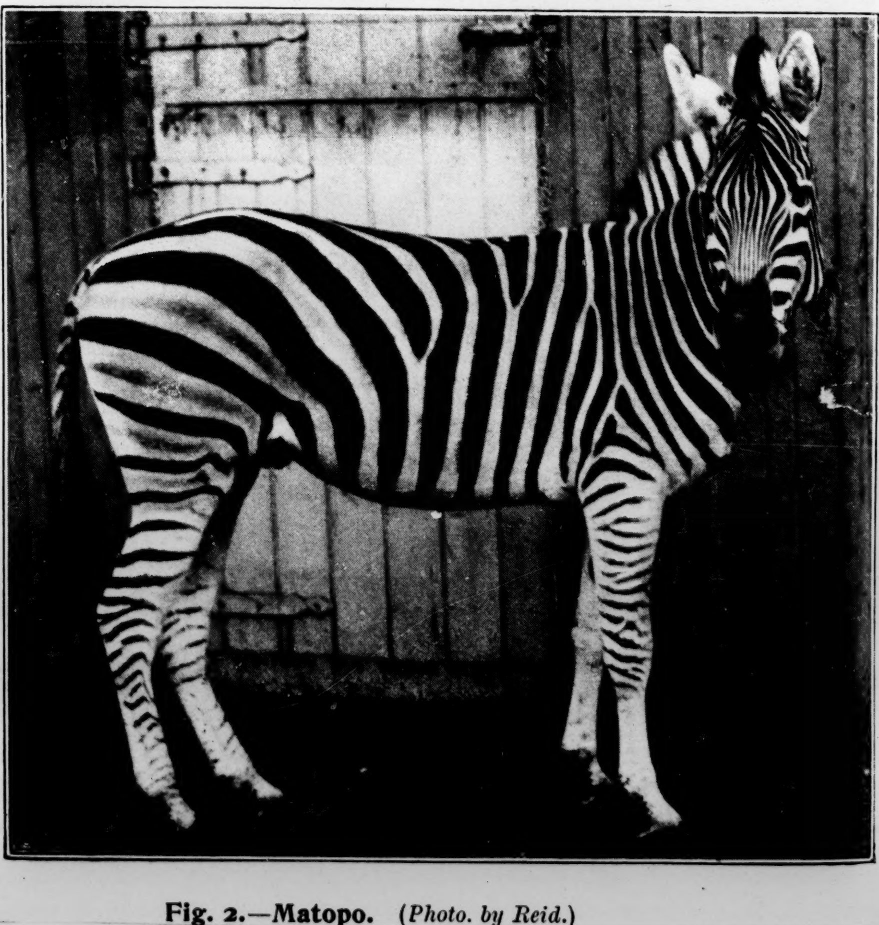

Fig. 2.—Matopo. (*Photo. by Reid.*)

BRITISH
23 AP 98
MUSEUM

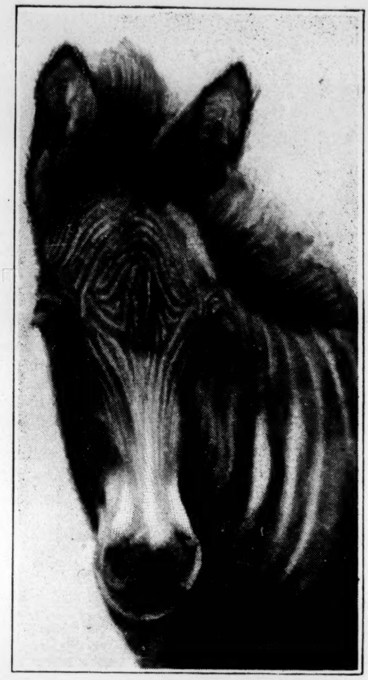

Fig. 1.--Romulus: Twenty-seven days old. (*Photo. by Reid.*)

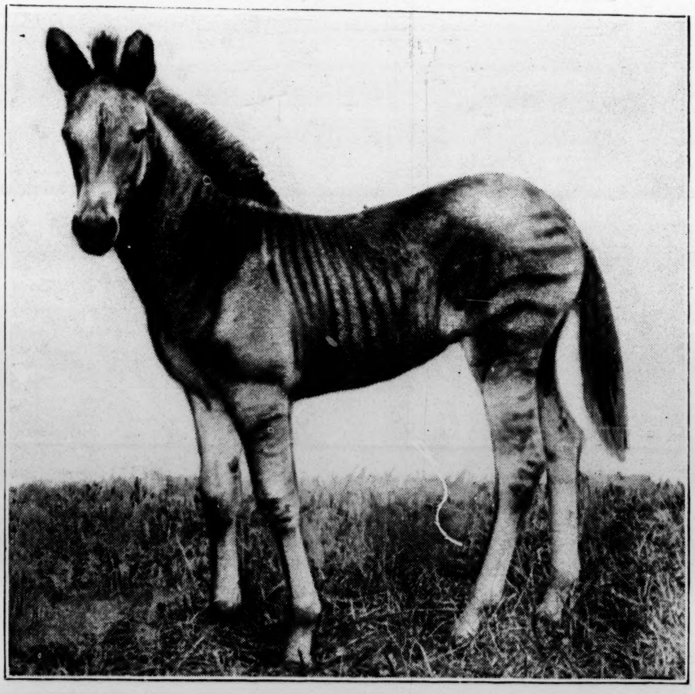

Fig. 2.—Brenda: Two months old. (*Photo. by Swan Watson.*)

BRITISH
23 AP 98
MUSEUM

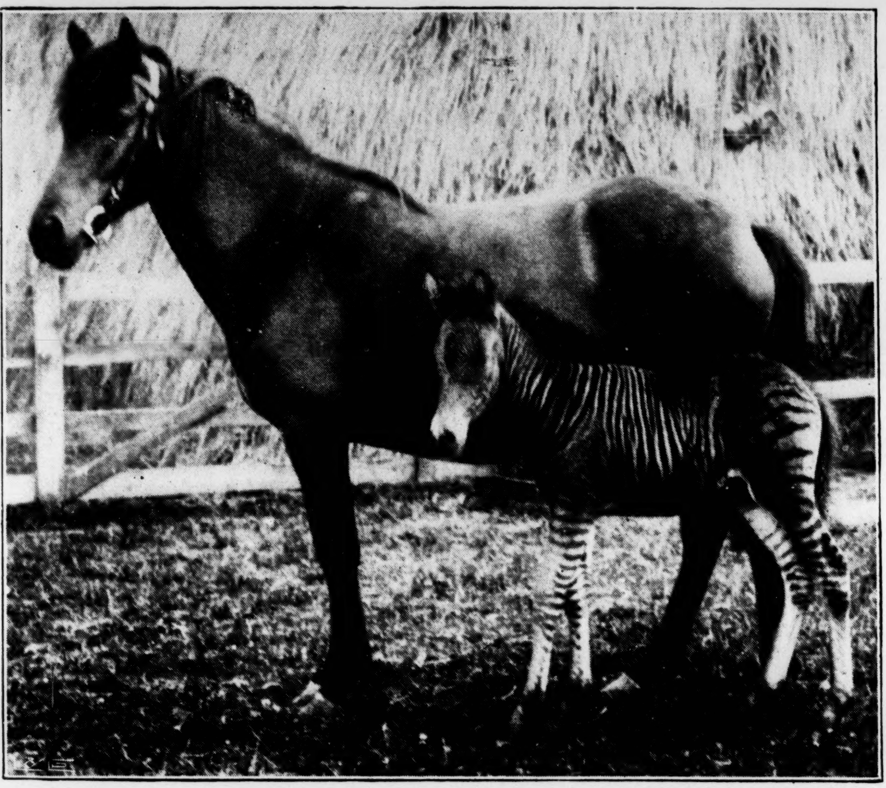

Fig. 1.—Romulus (Seven days old), and his dam, Mulatto.

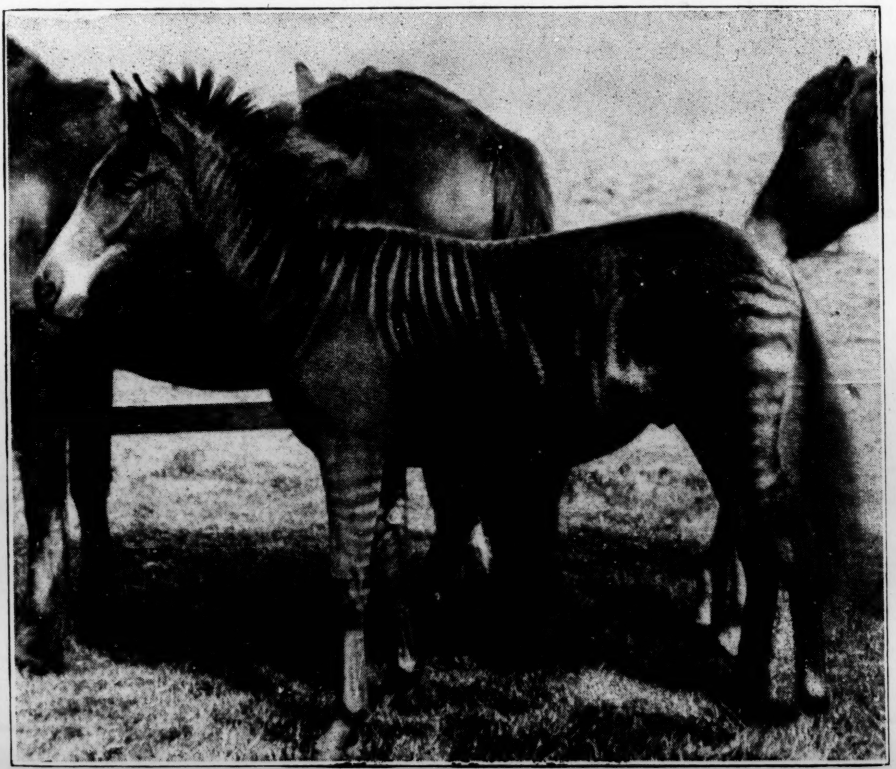

Fig. 2.—Romulus: One year old. *(Photos. by Swan Watson.)*